OCT 7 1922
Engineering Library

Telephony.

THE AMERICAN TELEPHONE JOURNAL

PUBLISHED EVERY WEEK
BY TELEPHONY PUBLISHING CORP.
116 S. MICHIGAN AVE., CHICAGO, ILL.

OCTOBER 7, 1922. [VOL. 83. NO. 15.]
Entered as second-class matter Sept. 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1879.

SINGLE COPIES, 10 CENTS
YEARLY, U. S. A., $3; CANADA, $4
ALL OTHER COUNTRIES, $5

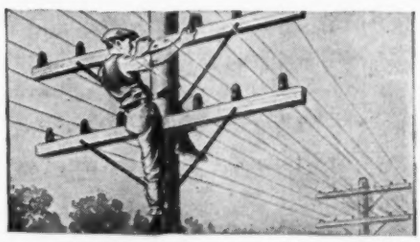
ANACONDA
Copper Telephone Wire
Tie Wires
643 Conway Bldg.
CHICAGO

EVERSTICK ANCHORS
lead the world in anchor sales.
WHY?
EVERSTICK Anchor Co.
St. Louis, Mo. U. S. A.

PEIRCE TRANSPOSITION BRACKETS
the original transposition brackets. Standard for telephone service. Made in several styles embracing every requirement.
Ask your jobber.
HUBBARD & CO.
PITTSBURGH, PA.
The hardware makes the line Hubbard makes the hardware

Telephone Cables
ALL SIZES AND CAPACITIES
Hard Drawn Copper Telephone Wire
Galvanized Iron Telephone Wire
Siemens-Martin and High Strength Strands
AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.
CHICAGO—112 W. Adams St.
CINCINNATI—Traction Building
NEW YORK—233 Broadway
BOSTON—176 Federal St.

Naugle Poles
IMMENSE STOCKS—Northern and Western Cedar.
24 HOUR LOADING—ordered 9 A. M.—en route 5 P. M.
BUTT-TREATING—any form—open-tank method. We PENTREX treat.
NAUGLE POLE & TIE CO. 5 So. Wabash Ave. CHICAGO, ILL.
New York Columbus, O. Kansas City Boston Spokane
MAIN YARDS: *Chicago, *Pinconning, Mich., Green Bay, Wis.
*Pentrexing and treating plants at these yards.



High Up Among the Live Wires

Where a poor tool would jeopardize the lineman's life, he unhesitatingly trusts in "Red Devil" Tools.
He knows that "Red Devils" will meet every claim, that they are made of the best materials and workmanship obtainable—that they are built with a sense of **responsibility for his life.**
That's why it pays to use "Red Devils"
Write for electrical tool booklet.
SMITH & HEMENWAY CO., Inc.
87 Colt St. Irvington, N. J.
Red Devil —*A name to remember when buying tools*

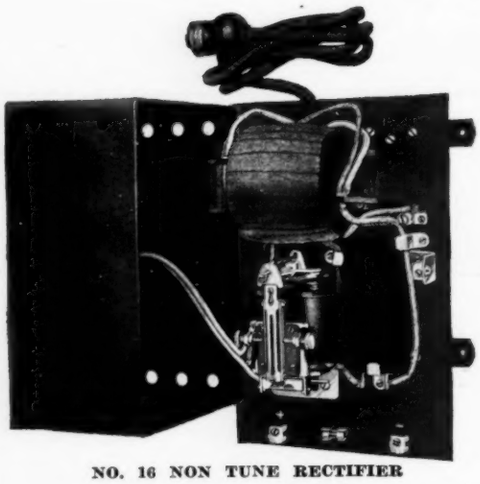
American Steel & Wire Co.'s
W & M Telephone Telegraph Wire
Strand—STEEL WIRE
Pole Steps
Descriptive literature—free
American Steel & Wire Company
Chicago New York

CEDAR POLES
Wire or write for delivered prices
NATIONAL POLE CO.
ESCANABA :: :: MICH.
220 Broadway, New York
2844 Summit St., Toledo, Ohio
Rialto Bldg., San Francisco

FORT WAYNE PRINTING COMPANY
FORT WAYNE, IND.
Printers and Blank Book Manufacturers
Write for Samples and Prices on I. C. C. Forms
Ours Are the Best

THE THIMBLESS EYE
is the latest improvement on
Matthews Scrulix Anchors
Costs No More
W. N. Matthews & Bro., Inc.
St. Louis, Mo.

Radio Accessories of Superior Merit
TIME TESTED



NO. 16 NON TUNE RECTIFIER

Leich NON TUNE Radio Rectifier

Keeps "A" Battery Charged at Home

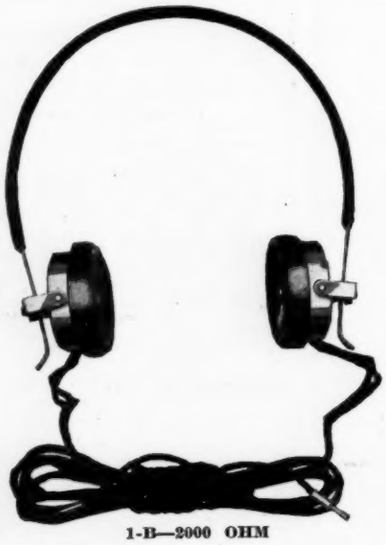
A Rectifier with all the improvements made in ten years of manufacturing successful mechanical rectifiers.

With the improved type of vibrating unit the Non Tune Radio Rectifier will operate successfully on power currents of wide range of frequency and voltage.

The relay lock now attached to the vibrator unfailingly opens the battery circuit when power current is interrupted. An operation that is absolutely essential for satisfactory service.

The NON TUNE Radio Rectifier is Safe - Reliable - Efficient

The Three Qualities That Make Home Charging Satisfactory



1-B—2000 OHM

Leich Radio Head Phones

A light weight, comfortably fitting head set that accurately reproduces tones of extreme variation of frequency and makes radio reception more enjoyable.

Coil, tungsten magnets, and diaphragm mounting ring are assembled in one unit and protected from damage by a highly polished removable aluminum shell. Supplied with Bakelite or hard rubber ear cap.

Cord terminals are entirely concealed.

A quality product at an honest price.

Write for Radio Bulletins
No. 99 - No. 100

LEICH ELECTRIC CO.

Telephones, Switchboards, Accessories

GENOA, ILLINOIS

DISTRIBUTORS

ELECTRIC APPLIANCE COMPANY
Chicago, Dallas, San Francisco, New Orleans

ST. PAUL ELECTRIC CO.
St. Paul, Minn.

POST GLOVER ELECTRIC CO.
Cincinnati, Ohio

TELEPHONE & ELECTRIC SUPPLY CO.
Spokane, Wash.

B-R ELECTRIC COMPANY
Kansas City, Mo.

Telephony.

THE AMERICAN TELEPHONE JOURNAL

Comprising Telephony, American Telephone Journal, Telephone Weekly, Telephone Magazine, Telephone Securities, The Telephone, Sound Waves

PUBLISHED WEEKLY BY TELEPHONY PUBLISHING CORP.
116 S. Michigan Ave., Chicago

H. D. FARGO, President and Treasurer.
G. M. ALLEN, Mgr., Copy Dept.
S. R. EDWARDS, Editor and Secretary.
J. R. HASTIE, Vice-President and Advertising Manager.
H. D. FARGO, Jr., Western Advertising Manager.

Entered as second-class matter September 4, 1908, at the post office at Chicago, Ill., under act of March 3, 1879.

Volume 83
Number 15

CHICAGO, SATURDAY, OCTOBER 7, 1922

Subscription—10 Cents a Copy
$3 a Year U. S., Cuba and Mexico
$4 Canada, $5 Other Countries

TELEPHONE RATES AND POLITICS

"Why 'Phone Bills Grow" is the title of an editorial that recently appeared in Hearst's Chicago morning newspaper. It is a strained, awkward attempt to boost public ownership of telephones, and while not intended to be humorous—being far from the cartoon page—it is really funny.

Mr. Hearst is often a strong advocate of public ownership of railroads and other public utilities. That is to say, he is strong in the sense that he is frequently preaching the advantages of public ownership, although he has never gotten very far with it.

While the public were complaining about the government operation of the railroads during the war, Hearst "laid off" the issue, but now that he is seeking political preferment—first the New York governorship and then the Presidency—his newspapers are again attacking the utilities and insisting that the public should take them over and run them.

* * * *

In picking on telephone rates as proof that private ownership should give way to public ownership and operation, the Hearst propaganda is short-sighted to a ridiculous degree. The editorial takes the American Telephone & Telegraph dividend rate of 9 per cent as a text, and says that the rate is fixed so as to attract the capital needed to carry on the business.

If owned by the public, the writer argues, government bonds could be sold on a 4¼ per cent basis, which would mean a saving of over $33,000,000 annually, that could be used in reducing telephone rates.

The Hearst mathematician figures it like this:

Nine per cent on the $700,000,000 Bell stock is $63,000,000 a year. Financed by government bonds at 4¼ per cent the annual interest charge would be $29,750,000. Difference, $33,250,000.

* * * *

The writer then concludes: "To the best and fairest of the corporations operating our public utilities, we pay annually $33,000,000 more than we would have to pay if the public owned the telephone plant. This situation, if it continues, must in time lead to public ownership, in our opinion, by sheer force of economic laws."

Being printed in Chicago, where graft, waste and inefficiency have looted nearly every activity in which political management has had a hand, this editorial urging public ownership of telephones sounds like a hollow joke.

To turn the telephone industry—or any other utility, for that matter—over to a gang of politicians would make Boss Tweed writhe in his grave in envy. There might be a reduction of telephone rates as a temporary sop to voters, but the record plainly indicates there would be a treble increase in taxes, to say nothing about an inevitable breakdown of telephone service standards.

* * * *

By a ludicrous coincidence, in the column right next to this plea for public ownership of telephones is another editorial referring to the Chicago board of education, several of whose officers and members have been indicted by the grand jury for looting the school funds.

Graft has seldom been absent from Chicago city politics, but in the past even the most hardened political gangsters have kept hands off the school children's money. That was always considered a sacred fund. While the politicians grabbed various other public moneys with a light heart—and usually got away with them—not till now have they ventured to despoil the school treasury. Yet the Hearst organization advocates public ownership of the telephones, which would mean placing them also under political control!

* * * *

Without discussing the wisdom of the Bell's 9 per cent dividend rate, anybody with even the slightest acquaintance with the blighting effect political management always has on a business enterprise, knows full well that government ownership of the telephone business would smash the service and prove a failure.

Of course, it would be a grand time for the politicians while it lasted. Think of the hundreds of thousands of jobs to fill, the fat contracts to let for materials and the vast power involved in controlling the lines of communication! Of course, few people out of politics would expect to have much telephone service, but then, we would have government ownership to take its place.

* * * *

Of course, it will be generally recognized that such an attack on telephone

rates is cheap demagoguery. The plea for public ownership is lugged in just to strike a supposedly popular chord.

Compared to most things telephone service is the cheapest commodity known. For genuine, indispensable service to the business and social life of the people, the telephone works for a wage so modest that regulatory bodies seldom have the face to reduce rates after a fair investigation.

It is only when the politicians desire to make a grand-stand play to the voters that a campaign is started against the telephone and other utilities which are then branded as "corporate interests." These "interests," by the way, are the thousands of people all over the land who own the stock and other securities of the utilities.

* * * *

The Ohio State Public Utilities Commission has compiled figures which show that in the past year the people of the state spent for public utility service—gas, electric light, street cars, telephone and water service—the sum of $177,532,800. Apportioned among the total population, this equals about $30 for each man, woman and child.

For telephone service Ohio spent $28,071,842, which, distributed among the 5,759,394 inhabitants, averages $4.87 per capita. Considering the importance and value of telephone service, this is a small amount, and explodes the claim of any demagogue that service companies are profiteering.

No doubt if the facts were presented, it would be shown that much more is spent for the movies, or for chewing gum, or for many other things that contribute far less to the comfort, convenience, safety and completeness of modern life than does the telephone.

No; this argument for public ownership on the pretext that telephone rates should be lowered won't wash at all. No American business man acquainted with the poor service the French and British governments give the public is at all keen to have the experiment tried in the United States.

During the war, when the government controlled the wires for one year there was a deficit of $14,418,237. The Postmaster General raised rates, too, and it was a sensible thing to do, moreover, for the companies were entitled to increased revenues at that time.

And no fair man will say they are overpaid today.

The "Magic" of Radio Telephony

The Principles of Radio Transmission and Operation of Radio Apparatus Set Forth So as to Give Every Telephone Man a General Knowledge of the Subject — Paper Presented at Telephone Plant School, Purdue University

By R. V. Achatz

Associate Professor, Telephone Engineering, Purdue University

The widespread interest in the radio telephone that has grown up over the entire country within the last few months has caused many telephone men to investigate this new development so closely related to their own business and to give some thought to the probable effect which it may have upon the present system of communication by wire lines.

When the telephone man first looks into the matter of radio communication, he is likely to be of the opinion that it is something mysterious and, unless he has been prepared by an amateur interest in the telegraph side of radio, he will probably regard it as something very complex and difficult to understand.

This will be especially true when he meets in the textbooks a vocabulary of strange words that has grown up around the new art. Wave length, continuous waves, carrier waves, tuners, ticklers, grid leaks, coupling and other radio terms are as strange to the telephone man of today as the term of the telephone man's language must have been to the telegraph men of 40 years ago.

If the principle of radio transmission and the operation of radio sending and receiving sets can be described in terms with which the telephone man is familiar, he will have no difficulty in getting a fair understanding of them, and it is the purpose of this paper to attempt an explanation of these things in simple language without going too deeply into the technical side of them.

It is not surprising that a nation that has been developed by the automobile into a nation of gas engineers within the last 20 years—a nation that has been made a nation of practical chemists by the kodak—should adapt itself quickly to the use of the radio receiving set, once the difficulty of talking in dots and dashes was removed.

There is scarcely more technical skill required to operate a radio receiving set than there is to operate a phonograph and certainly much less than to focus a camera, time the exposure, develop the film and print the picture. Even the transmitting set does not require much greater skill than is required to time the engine, adjust the carbureter or make the many other adjustments that are required in the ordinary operation and maintenance of an automobile.

The telephone man will find the circuit much more simple and more easily understood than many of the modern switchboard cord circuits which are being put into central offices by the hundreds. The man whose experience has been entirely with manual systems will find that he must learn a much larger vocabulary of new words when he begins the study of automatic systems than if he takes up the study of the radiotelephone. There is little more difficulty in understanding the transmission of radio signals through space than there is in understanding the transmission of voice currents along a wire.

The telephone repeater and the carrier current systems that are becoming more and more common in wire telephony employ many of the same principles as radio telephony, and the time is not far distant in which the connection of wire to radio circuits and vice versa will become as much a part of telephone practice as the connection of wire circuit to wire circuit is today.

The telephone man who wishes to keep abreast of developments in his field must know something of both wire and radio systems, and telephone engineering is rapidly expanding into the wider field of electric communication engineering. The following sections will attempt to describe briefly some of the principles and apparatus that are involved in this expansion.

Radio Transmission Produced by Waves.

Reduced to its simplest and most general requirements, it may be said that the transmission of signals through space, or radio transmission as it has come to be known, requires (1) a means of creating some kind of a disturbance; (2) a medium in which the disturbance is created and through which it travels; and (3) some kind of a device that is capable of

responding to the disturbance as the disturbance travels outward through the medium.

A rather crude illustration of these general requirements may be obtained by considering a vessel or pool of water upon

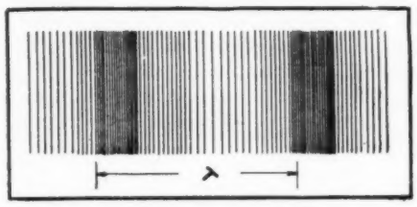


Fig. 1. Condensation and Rarefaction of the Air.

the surface of which at some distance from the center a cork is floating. If the water at the center is disturbed by means of a plunger which is given an up and down motion, waves are created which travel outward over the surface of the water. As they pass the cork, the latter will be given an up and down motion as the water rises in a crest or sinks in a trough.

In this illustration each of the three requirements mentioned is present and may be seen with the eye. The plunger with which the disturbance is created serves as the transmitting device, the water serves as a medium by which the disturbance is transmitted, and the cork float is the receiving device that is responsive to the disturbance in the medium.

Another case where all three of the general requirements are present is in the transmission of sound. If a gong is placed in the center of an open field in which there are no trees, buildings or other obstructions, a man standing in another part of the field will hear the sound of the gong if it is struck with a hammer. In this case the source of disturbance is the gong, the transmitting medium is the air, and the device which responds to the disturbance is the human ear.

The mechanism of sound transmission is generally understood and no detailed explanation is needed here. It is merely necessary to say that the gong is set into vibration when it is struck with the hammer. The vibrations cause a disturbance in the air near the gong, alternately compressing it and relieving the compression. These alternate condensations and rarefactions of the air are communicated to the surrounding body of air and the disturbance travels outward.

The sensitive diaphragm in the ear of the listener is set into motion by the air disturbance and the sensation known as sound is produced. The motion of the air back and forth periodically as the condensations and rarefactions occur is called a wave, and the disturbance is commonly known as a sound wave. A conventional representation of the condensations and rarefactions of the air is shown in Fig. 1. A definite time is required for the disturbance to travel through the air and experiment has shown that the velocity of sound waves in air is about 1,100 feet per second.

An interesting fact in connection with sound waves, and one which has a bearing on what is to be said later about radio receiving stations, is the occurrence of sympathetic vibrations. This is commonly illustrated in the laboratory by means of tuning forks. If a tuning fork is struck by a hammer and is allowed to vibrate momentarily, it will be found that an exactly similar fork placed near the first fork will be set into vibration by the sound waves produced by the first fork.

If the first fork is stopped, the sound of the second fork will be heard clearly. If, however, the second fork is not a duplicate of the first no vibration will result. The same results may be obtained by means of vibrating strings. If one string is set into vibration and a second string is tuned to exactly the same pitch, it will respond sympathetically. If the tuning of the second string is changed, it will no longer respond.

It has been found that, if certain electrical conditions are set up at one place, a response may be obtained at a distant place if the proper type of device is used. If a sufficient amount of power is used and the device for detecting the disturbance is sufficiently sensitive, the distance may be many miles or even thousands of miles.

The fact that an electrical disturbance is not limited to the wires in which the current flows is well known. Telephone men have direct evidence of this from their experience with cross talk and inductive disturbances in wires that are completely insulated from the disturbing wires. To create such a disturbance, some kind of change is necessary in the disturbing circuit as no disturbance is created when a steady current flows in a wire.

The first requirement for radio transmission is present when the proper kind of a change is made in the electrical conditions in the transmitting circuit. The third requirement is met when the proper receiving circuit and device for detecting the disturbance is provided.

Since we are unable to conceive of an action at a distance without some intervening medium, we are driven to the assumption that some such medium exists to transmit the disturbance. Inasmuch as the action takes place in space from which all air has been removed it is necessary to assume that this medium, called the ether, exists in all space whether or not physical matter exists in the space.

Since a change in the electrical conditions is necessary to create a disturbance in the ether, a motion of electrical charges, or what is the same thing, a change in the current flowing, is implied. In Fig. 2-*A* a vertical wire is represented as being charged negatively and the earth below it as being charged positively.

If conditions are changed so that the negative charges are transferred to the earth and the positive charges are transferred to the wire, a disturbance is created in the space surrounding the wire and an impulse is transmitted outward through the ether. If the charges are transferred back and forth rapidly, a succession of impulses are communicated to the medium which travel outward through space.

This succession of impulses, traveling outward, is a form of wave motion just as the motion of the water or the vibration of the air cited above is a wave motion. Fig. 2-*B* is a conventional representation of a series of radio waves traveling outward from the vertical wire.

A definite length of time is required for the wave to travel from one point to another. Theoretical considerations indicate that light waves and radio waves are propagated by the same kind of a motion in the same medium and, therefore, at the same speed, 186,000 miles per second. When the great Lafayette station at Bordeaux in France was opened, it was reported that the signals sent out were heard after they had passed entirely around the earth and that the time required to travel around the earth was approximately one-seventh of a second which checks fairly closely with the theoretical speed.

Another indication that the transmission of radio signals is by wave disturbance lies in the fact that the receiving station must be "tuned"—that is, must be adjusted to the same electrical characteristics as the sending station.

It has been found that a condenser, which has been charged and is then allowed to discharge through a coil, requires a certain length of time before the

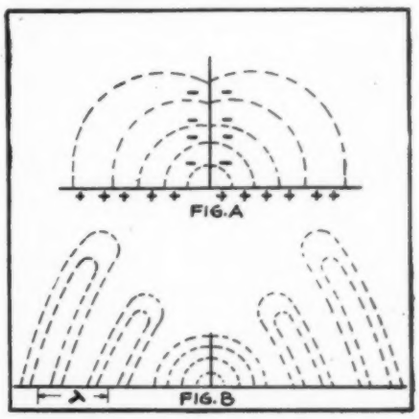


Fig. 2. Charges on Wire and Earth—Series of Radio Waves.

discharge is completed. If the resistance of the coil is sufficiently low, the current does not stop as soon as the condenser is completely discharged but tends to continue to flow and build up a charge in the opposite direction, very much as a

pendulum bob does not come to rest at the bottom of its swing but swings past to the other side.

The combination of condenser and coil has a natural period of discharge and the current will tend to oscillate back and

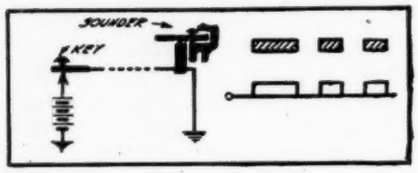


Fig. 3. Simple Wire Telegraph Circuit.

forth at a frequency depending upon the natural period of the circuit. This natural period will depend upon the capacity of the condenser, for the larger the capacity the longer it will take to discharge through a given coil. It will likewise depend upon the coil if the capacity is fixed, for the greater the number of turns of the coil, the greater its inductance and the greater length of time it will tend to keep the current flowing during the discharge of the condenser. The natural frequency of any circuit may be changed by adjusting either the condenser or the inductance of the coil or both.

In the case of the receiving circuit, the maximum response to the signals is obtained when the circuit is adjusted so that its natural period is the same as the transmitting set, just as the maximum response was obtained by tuning the second string to the same pitch as the first in the experiment illustrating sympathetic vibration of musical strings previously described.

All Circuits Are Not Equally Good Radiators.

It has been found that certain arrangements of conductors will send out waves of greater intensity and to greater distances than will other arrangements. If the wire in which the current is caused to reverse periodically, or is oscillating, to use a more commonly-used expression, is arranged in a vertical position and is connected at the top to a horizontal network of wires, one of the best arrangements is produced.

This arrangement, which is called an antenna, is really a large condenser, one plate of which is the horizontal network of wires and the other the earth. Such a system of conductors has a much greater ability to radiate a wave than a loop of wire or an ordinary metallic circuit, such as is used in telephone lines, where one wire carrying a current in one direction has the effect of neutralizing the radiation from the other wire carrying current in the opposite direction.

Likewise, the ordinary circuit carrying 60-cycle current for electric light and power radiates very little if any energy due to the low frequency while a circuit in which the oscillations occur at frequencies in the range of 10,000 to several millions of cycles per second, radiate considerable amounts. The essential things, therefore, at a radio-transmitting station are two capacity areas, or plates of a condenser separated by a considerable distance, and a means of producing high frequency oscillations of current in the two plates and the wires connecting them.

Relation Between Wave Length and Frequency.

In the various descriptions of stations and their operation, reference is frequently made to the wave length at which the station operates. The length of a wave in water may be defined as the distance between two successive crests or two successive troughs created as the waves progress over the surface. Similarly, the length of a sound wave may be defined as the distance between two successive condensations or between two successive

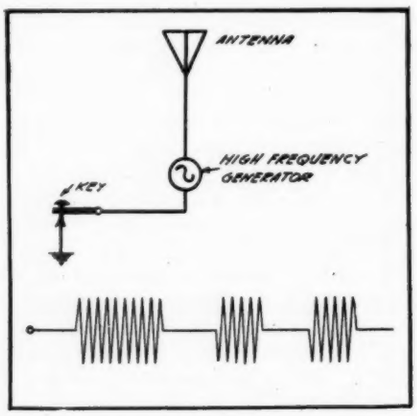


Fig. 4. Radio Telegraph Signal Transmission.

rarifications of the air. In Fig. 1 this distance is indicated by the Greek letter lambda (λ).

In the case of radio waves, the wave length is defined as the distance between two points at which the electrical disturbance is at its maximum in the same direction and is likewise represented by the Greek letter lambda, λ, as shown in Fig. 2-*B*. Since the wave length refers to stations in all parts of the world, it is customary to use the metric instead of the English system of measurement, and the wave length is always expressed in meters instead of in feet or yards.

As the speed at which the waves travel does not change, there is a constant relation between the frequency of the oscillations at the sending station and the wave length of the waves produced by them. This relation may be understood if the conditions on the surface of a liquid are considered.

If the waves travel outward from the point of disturbance at the rate of one foot during each second of time and the disturbance is created by one complete motion upwards and downwards in each second, the wave crest will travel outward and will reach a point one foot from the disturbance just as the next crest is being formed. The wave length will then be one foot. If the disturbance makes two complete motions in one second, the crest will have traveled only six inches by the time the next succeeding crest is formed. If the frequency of the disturbance is three per second, the distance traveled by the crest will be four inches.

From a consideration of this, the general rule may be drawn that the wave length is equal to the speed of the wave divided by the number of complete oscillations that the disturbing source makes each second. In the transmission of radio waves, the speed is 186,000 miles per second, which is equal to 300,000,000 meters per second, so that an oscillation occurring at the rate of 500,000 per second will produce a wave 600 meters long.

Production of Radio Telegraph Signals.

It is convenient to consider the manner in which radio telegraph signals are produced before discussing the transmission of voice by radio waves. In ordinary Morse telegraphy the letters are represented by dots and dashes. If the key is held down for a brief period, a dot is produced and if held for a longer period a dash is transmitted.

A simple wire telegraph circuit is shown in Fig. 3. If the letter *d* is to be sent, the key is held down for a period representing a dash, and a current flows from the battery over the line and operates the sounder. This is followed by two depressions for shorter periods representing the two dots. The flow of current over the line is represented by the lines representing the rise of current above the zero line at the right of the illustration. Other letters are formed by other combinations of dots and dashes.

The transmission of radio telegraph signals is represented in Fig. 4. The two essential parts of the radio transmitter

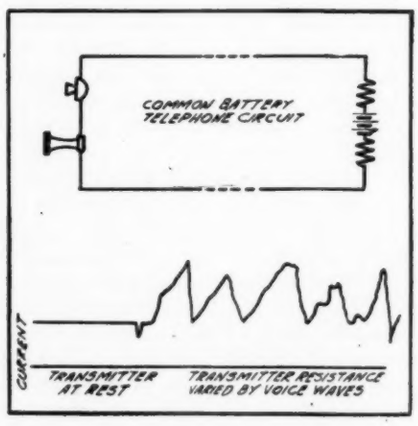


Fig. 5. Essentials of Common Battery Telephone Line.

are shown by the symbols representing the antenna and a generator of high-frequency oscillations. A key is connected in series with the circuit and as long as the contact remains open, no oscillations occur in the antenna.

If the key is depressed, the generator causes oscillations of current in the antenna and waves are sent out as long as the key is held down. If the key is held down for a longer period and then two shorter ones, trains of waves are sent out which persist as long as the key is held down and represent the dash and two dots of the letter *d* as shown to the right of Fig. 4.

It is a characteristic of the wire telegraph circuit that signals are produced by the making and breaking of the circuit in accordance with the characters to be transmitted, and the radio telegraph system retains this make and break method of producing the character. In practice, however, the circuit is not quite as simple as that shown in Fig. 4, but the principle is the same.

Voice Transmission by Radio Waves.

The transmission of voice by radio may be explained by comparison with transmission over wires in the same manner as the transmission of dots and dashes of the telegraph signals just considered. Fig. 5 shows the essentials of the familiar common battery telephone line. When the transmitter is at rest, a steady current flows from the storage battery out over the line and through the transmitter.

As soon as the transmitter is spoken into, its resistance varies and the strength of the current varies in a manner depending upon the vocal sound produced. This variation in the strength of the current is represented by the variation in the line indicating the current at the right in Fig. 5. The receiver at the distant station responds to the variations in the current and the sound is reproduced.

The transmission differs from the telegraph in that variations of current are employed rather than interruptions. In the telephone system the direct current from the battery may be looked upon as a "car-

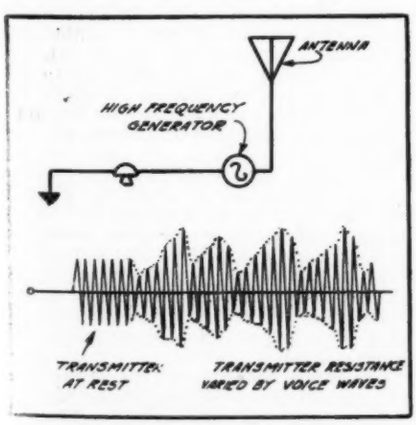


Fig. 6. Radio Telephone Circuit.

rier" of the voice waves and a receiver as a device that detects the variations or separates the voice wave from the carrier.

In the radio telephone system, the transmitter may be used to vary the strength of the high-frequency current in the transmitting circuit just as it is used to vary the strength of the direct current in the ordinary telephone circuit. This is shown in Fig. 6 which is similar to Fig. 4 except that the key has been replaced by the transmitter.

As the resistance of the transmitter changes, due to the action of the voice, the strength of the high-frequency current is varied and, consequently, the amount of energy radiated from the antenna is varied. Thus the electric waves radiated from the antenna serve as a "carrier" of the sound waves as the direct current serves as a carrier in the wire line.

Reception of Radio Telephone Signals.

If the receiving circuit is adjusted to intercept the radio waves and contains a device to detect the variations and reproduce the sound waves that correspond to the variations, the radio telephone system is complete.

In addition to the antenna, the receiving station is equipped with a coil, the number of turns of which can be varied to adjust the electrical constants of the circuit so that it will respond to the particular wave length being transmitted. When this adjustment is made, the passing wave sets up oscillations of current which correspond to the oscillations at the sending station.

If the telephone receiver is connected in series with the circuit no response to the signals will be obtained, however, as the frequency is so great that the diaphragm will not follow the variations. It is necessary to provide an additional device, therefore, which will permit a response in the receivers. Referring to Fig. 5 it may be seen that the variation of the amplitude of the oscillations is the same on each side of the zero line.

If a device can be found which will suppress the current in one direction only, the variations on one side of the zero line will remain. While the receiver diaphragm will not follow the individual oscillations, it will follow the change in amplitude which corresponds to the voice wave and will reproduce the sound that is transmitted from the sending station.

It has been found that certain crystalline substances have the characteristic that permits current to flow in one direction only and some of thsee substances may be used. Among the crystals used are galena, silicon and carborundum. A simple receiving circuit using one of these crystals is shown in Fig. 7. The arrowhead indicates the point of a small wire resting on a sensitive spot on the crystal.

Current will flow through the detector and receiver when it is flowing in one direction in the antenna but will not flow in the receiver when the current in the antenna is reversed. On account of the very small current produced in the receiving antenna it is necessary to use receivers in pairs and they are wound to a high resistance, usually 2,000 or 3,000 ohms to the pair.

While crystals act very satisfactorily in detecting strong signals, they are not sufficiently sensitive to detect weak signals from a station at a considerable distance

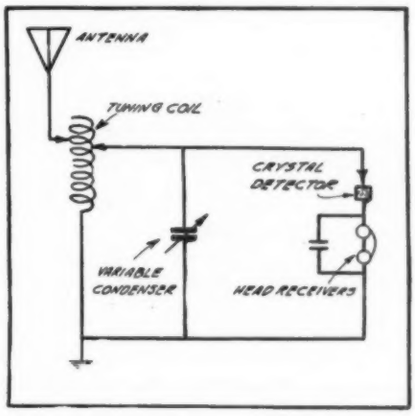


Fig. 7. Simple Radio Crystal Receiving Circuit.

and another type of detector, the audion or electron tube, is used which not only acts as a detector but also may be used to amplify the signals.

Texas Convention to Be Held at Dallas in March.

At a meeting of the board of directors of the Texas Independent Telephone Association held in Waco, September 20, it was decided to hold the next annual convention of the association at Dallas.

The by-laws of the association state that the annual convention shall be held in the month of March. The exact date for the next convention was left to a committee composed of President R. B. Still, Secretary L. S. Gardner and Treasurer J. C. Paxton.

In all probability the convention will last three days. One of the special features will, no doubt, be a plant and operating school, something on the order of the plant school which proved such a success at the last convention.

Entire Estate of Telephone Inventor Left to Widow.

The will of Alexander Graham Bell, filed September 14 in Washington, D. C., for probate, leaves his entire estate, real and personal, to his wife, Mabel Gardiner Bell, absolutely and without conditions.

The widow and Dr. Bell's cousin, Charles J. Bell, president of the American Security & Trust Co., are named as executors, with the request that no bonds be required of them for the faithful discharge of their duty. No schedule of the value of the estate has been filed.

The document was executed June 22, 1898, at Beinn Bhreagh, near Baddock, in Nova Scotia, in the presence of four witnesses.

Appraisals in Income Tax Returns

United States Independent Telephone Association Issues Circular Letter Discussing Effect of Appraisals Not Being Accepted by Income Tax Unit—Copy of Treasury Department Ruling Specifying Conditions for Accepting Appraisals

President F. B. MacKinnon, of the United States Independent Telephone Association, has just sent out a statement regarding the value of the telephone properties in connection with income tax returns.

In this circular to members of the association, President MacKinnon points out that prior to July 10, 1922, the Commissioner of Internal Revenue refused to accept appraisals of telephone properties as evidence of the value of the property at the time of its acquisition by the telephone company. This refusal has worked a great hardship on many companies because of their inability to show by their books the cost of their plants.

It is well known in the industry that the majority of the Independent companies, which, like Topsy, "just grew," have no accurate records by which proof of investment can be made. Many of the companies, originating as partnerships and later merging with other partnerships, prior to that merger kept no accounts other than the subscribers' ledger.

Since the creation of state public service commissions and the extension of the jurisdiction of the Interstate Commerce Commission, the majority of the Independent companies have found it necessary to have made an inventory and appraisal of their property. But the income tax unit has refused to accept such appraisals as evidence of the invested capital of the companies, even in those cases where state commissions have accepted the appraisals as proof of values in rate hearings.

The result of this attitude of the income tax unit has been that in a number of instances the companies have been obliged to pay a larger income tax than they would have paid had the appraisal been accepted as proof of investment.

The association, on behalf of those of its members for whom it has appeared before the committee on appeals of the income tax unit, has invariably called attention to the injustice of the position taken by the Commissioner of Internal Revenue, since the companies by his ruling were debarred from offering the only proof they could offer as to the value of their properties. Similar protests were made by companies engaged in other lines of business to whom the same regulation was applied.

On July 10, 1922, the Commissioner of Internal Revenue issued as treasury decision No. 3367 the following amended article 836 of regulations 62 (article 836 of regulations 45) by which an appraisal by engineers not regularly in the employ of the company will be accepted as proof of the value of the company's property on the date that property was acquired.

By this decision, which we quote below in full, a company which cannot prove its invested capital by its accounts may have an appraisal made to prove the cost of its property on a certain date or may submit an appraisal heretofore made by which it may prove—in its claimed invested capital. As the decision says, such an appraisal" will be accepted only after rigid scrutiny."

As the income tax auditors are checking up 1917 and prior year tax reports, it is most important that all companies study and understand this new regulation so that in their dealings with the income tax unit they may be able to properly present their claims as to invested capital.

The treasury decision is as follows:

(T. D. 3367)
War Excess Profits Tax
Article 836, Regulations 45, (1920 edition) and Article 836, Regulations 62, amended.

Treasury Department,
Office of Commissioner
of Internal Revenue,
Washington, D. C.

To Collectors of Internal Revenue and Others Concerned:

Article 836, regulations 45, (1920 edition) and article 836, regulations 62, are hereby amended to read as follows:

Article 836. *Tangible property paid in; value in excess of par value of stock.*—The paid-in surplus allowed in any case is confined to the value definitely known or accurately ascertainable at the time the property is paid in. Evidence offered to support a claim for a paid-in surplus must be as of the date of the payment. It may consist among other things of (a) an appraisal of the property by disinterested authorities; (b) a certificate of the assessed value in the case of real estate, or (c) evidence of a market price in excess of the par value of the stock or shares.

Opinion evidence, expert or otherwise, of the value of property as of a prior date will not be accepted. Retrospective appraisals submitted in support of a claim for a paid-in surplus will not be accepted in any case where other reasonably satisfactory evidence is available and in any case will be accepted only after rigid scrutiny and will be followed only to the extent to which their reasonableness is fully established.

The property which was paid in is the basis of the appraisal, and the appraisal must reconcile the accounts so as to reflect accurately the actual value on the date as of which the appraisal is made and the depreciation sustained. Proper consideration must in all cases be given to depreciation and the expired and remaining serviceable life of the property must be shown.

To be acceptable retrospective appraisal must show: (1) the history of the business and manner in which the information or data was acquired; (2) the manner in which the appraisals were constructed; (3) the inventory on the date of the appraisal in detail; (4) the date of acquisition of all items remaining in the inventory as of the date of appraisal; (5) the elimination from the inventory of all items acquired subsequent to the date as of which the appraisal is made and how this was effected (all items, the date of acquisition of which can not be definitely determined, should be listed separately and all the facts bearing upon the date of acquisition given); (6) the replacement cost at the date as of which the appraisal is made of each item accepted as on hand on that date determined upon competent data, with a statement of the method employed in arriving at such cost (estimate and general statements will not be accepted); (7) the rate and total amount of depreciation as shown by the books; (8) the rate and total amount of depreciation taken upon each item included in the appraisal for the purposes of the appraisal (if other than normal rates of depreciation are used the reason therefor and the method of computing depreciation must be fully explained); (9) the actual cost when ascertainable of each item included in the appraisal; (10) the book value on the date as of which the appraisal is made of all the items included in the appraisal, and (11) a detailed statement of all plant facilities and additions, represented by capital expenditures previously written off, which were still in use on the data as of which the appraisal was made and all the depreciation actually sustained or accrued on such items.

No claim will be allowed for paid-in surplus in any case in which the addition of value has been developed or ascertained subsequent to the date on which the property was paid in to the corporation, or in respect of property which the stockholders or their agents on or shortly before the date of such payment acquired at a bargain price, as for instance, at a receiver's sale.

Generally, allowable claims under this article will arise out of transactions in which there has been no substantial change of beneficial interest in the property paid in to the corporation and in all cases the proof of value must be clear and explicit.

C. P. Smith,
Acting Commissioner of Internal Revenue.
Approved: July 10, 1922.
A. W. Mellon,
Secretary of the Treasury.

SELF-MASTERY FOUNDATION OF HAPPINESS.

There is no foundation for happiness except self-mastery; and children who are trained to know no masters but their own desires and to obey no will except their own whim are pretty sure to come to grief.—Dr. Frank Crane.

Creating Better Public Relations

Central Office Logical Place to Start Campaign Along Lines of Humanizing Telephone Machine—Importance of Humanizing Answering Phrases—Paper Read at Jamestown Meeting of Up-State Telephone Association of New York

By J. J. Welsh

Division Superintendent of Traffic, New York Telephone Co.

In every village, town and city, there is usually a telephone central office in which there is installed sufficient switchboard equipment to care for the requirements of the particular community. In addition to the switchboard located in the operating room, we also have the terminal room in which are located ringing machines, frames, batteries, testing apparatus, etc., and a large number of cables entering it from the outside. We take great pleasure in showing our visitors this equipment which we telephone people think is wonderful.

First, let us look at this from the subscriber's point of view. As I said before, it means a great deal to us but what does it mean to the public. Like many other things, we know that the public will not be impressed by this wonderful equipment unless we can make it do something which will draw the public to it. Now how are we to do it? Let us consider this question for a moment.

You traffic people will, of course, naturally say we can make a start in our central offices. I agree that this seems to be the logical place to start a campaign of this kind. We have a large number of employes handling traffic work who come in direct contact with the public in the handling of calls and who are also in a position to do wonderful work along the lines of really humanizing the telephone machine.

We have in all our larger central offices a staff of instructors whose duties are to make a series of ten observations about twice a month on each operating employe in the central office. By these observations the instructors are able to determine the grade of work performed by each employe, noting any bad errors, not only from the operating side but also from the public relations viewpoint.

After making the ten observations, the instructor immediately takes the operator away from her position and points out to her in a kindly and helpful way any operating faults she may have, and also endeavors to make the operator see the value of a pleasant, cheerful voice when talking to the subscriber and to her fellow employes who help her in completing calls.

This instructor's work is of great value to the company as we are now able to reach every employe in the central office; while by the old method only a few employes could be reached by the chief operators who were instructed and advised as to the company's wishes as regards the giving of good service and the furthering of public relations. We have found that by this method all the central office employes are much better informed regarding the attitude the company wishes them to take in dealing with the public.

You all know that we cannot get the public with us unless we render a satisfactory grade of service, and this employe is in a position to instruct and train the operators in the technique of operating so that she does give this grade of service. The employes picked for this instruction work are of a very good type and they have so conducted themselves as to win the confidence of the entire operating force. When the instructor takes up any series of observations with an operator, she does it in such a manner as to make the employe feel she is being helped and not criticized.

While it is not necessary for us to appoint an employe to act as central office instructor in offices of less than 50 people, the chief operators in the smaller offices are handling their employes in the same manner, and the furthering of public relations and the giving of good service has been helped considerably in this way.

A little pamphlet was made up by our general traffic manager, entitled, "The Furthering of Public Relations," and a copy of this was given to each employe after being reviewed with her by the instructor or chief operator. This pamphlet is reviewed from time to time with the employes so that her interest will not abate.

The pamphlet gives the various phrases as used by the operators and shows just how they should be repeated when talking to the subscriber. We are dealing with the human element when we are working on public relations, and cut and dried rules will not fit. It is necessary to use many and various methods in keeping up the interest of our employes and I am only citing a few of the most important methods that we have used so far.

To further improve our relations with the public we, I might say, modified our rules for handling calls at night to take care of reports where the subscriber reports his bell rang and there was no one to talk with him on the line. Between the hours of 11 p. m. and 7 a. m., night operators repeat the number as given, slowly and distinctly.

If the subscriber does not acknowledge the repetition, the operaor will say in a deliberate manner with rising inflection, for example: "Is that 12-34?" It is felt certain that if the proper inflection is used, an acknowledgment will be received. The night operators are authorized to use phrases that seem best to meet the occasion when a subscriber says that his bell rang, but as an aid to the type of phrase to be used the following was suggested:

"I am very sorry you were called. While at this minute we cannot locate the party who called you, we will investigate and give you a report." And a report is given some time during the following day. If the subscriber indicates that he wishes an immediate report, however, the matter is investigated and a report given at once.

The day-time phrase, "You were called by mistake; will you excuse it, please?" is cold and formal and does not properly express the regret that we feel at disturbing the subscriber during the night hours.

In order to have the necessary information so that it will be possible to tell the subscriber who called him, we keep a record of all calls after 11 p. m. This record is kept on a scratch pad. The chief operator upon assuming her duties in the morning, looks over the "bell rang" reports from the previous night, investigates and calls the subscriber as soon as possible, saying that we know that he had been called in error during the night.

The subscriber is advised as to whether it was the fault of an operator or of a subscriber. We have made it very clear to our people that the best way to express our regret is by the tone of the voice, and that we should take every precaution not to use a mechanical tone of voice or our efforts to apologize for the error will be in vain.

Over 90 per cent of all contracts be-

HE HIT THE BULLS- EYE.

In a letter enclosing his check renewing his subscription, H. M. Tuggle, of the New State Telephone Co., Roosevelt, Okla., says:

"Apropos of all the discussion to educate the small telephone operator as to his rights and the debt he owes himself and family, as well as his obligation to his subscribers, I beg to submit that a consistent reading of "Telephony" will accomplish more in that direction than an equal amount spent in any other way."

tween the company and the public are over the telephone where the tone of voice alone leaves a good or bad impression of the employes and their company. We have been giving this phase of the work special attention for the past year and I am glad to say that the employes of our company are noted for their courtesy in dealing with the public.

Courtesy on the part of our operators depends upon the tone of voice as well as the words used which give to subscribers a pleasing impression of the service and of the high type of young women engaged as operators.

The phrases such as "Please," when making a request; "Thank you," when subscriber complies with a request; "I beg your pardon," when something goes wrong, all go to humanize the machine. I would also like to point out that in operating there is danger of the tone becoming mechanical and indifferent. This, I suppose, is due in a way to the fact that operators are not face to face with subscribers.

A mechanical tone of voice is displeasing and suggests indifference or inattention. Every employe involved in the operation of a telephone plant should contribute some part of his or her personality to their work. Each and every one of us, irrespective of the position we hold in the organization, is capable of putting individuality into our particular job. Our aim must be to do the job well and make the subscriber feel we are interested in serving him.

What a wonderful thing it would be to have our subscribers say that, in addition to speed and accuracy, our employes are very courteous. We invariably judge other organizations by the employes with whom we come in contact. If this is so, don't you think we are judged in the same manner? Yes, very much more so—for we represent a public utility. Therefore, double effort must be exerted by the employes by putting personality into their work in order to overcome the loss of a face-to-face contact.

When a lamp lights or a drop falls, we answer "Number, please?" Do we answer this call with the tone of voice that means to the subscriber that we are ready to serve and glad he called, or is it said in a tone which sounds to the subscriber, "Well, what do you want?" You know the phrase "Number, please?" can be said both ways and the subscribers are a wise crowd and can always tell the sincere from the insincere.

What I am trying to make clear is that words alone cannot do the trick—it is a thing of the heart; while courteous words are on the tongue, our actions belie the words and show our inner spirit.

When a telephone company has the good will of the public in any community, it has the biggest asset that can be had, but this important asset can only be gained when each individual employe is on the alert to serve the public.

No general rules can be mapped out for the giving of a service which is truly human. In fact, none is wanted, for then it becomes mechanical. Human service is the kind that springs from the heart and shows a desire to render real service.

TODAY

By Miss Anne Barnes

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Away back in the early days of Iowa, even before the days of the railroads, a covered wagon filled with folks and furniture and provisions came to a stop at a certain point within the boundaries of Iowa.

The occupants of the wagon tumbled out, looked to the north, the south, the east and the west for signs of habitation, but saw none. Instead, they saw God's unappropriated blessings everywhere; so they were satisfied to rest.

The animals were unhitched and tethered. A fire was built and a first meal was served to man and best on the present site of one of Iowa's best towns.

It is needless to state that these pioneers stayed, endured the hardships along with the blessings of a new country. Others joined them. Thus, in the course of time and human events, a town was founded. Later came the railroad and the postoffice.

As I peer out of the train window when approaching that town in the night, and see the million twinkling lights, I think of a story told me by a very old man who lives there—the story of one burning light on a prairie; of a meal; and tired folks, the occupants of the covered wagon, the founders of *this* town, sleeping under the stars.

The station is called and I am again living in the present. I reflect, as I pick up my baggage, "If these pioneers had not lived up to *their* todays, where would Iowa and its people be?"

MORAL: Today's successes are the results of our yesterdays. If we are unwilling to live up to our todays, we are not prepared for our tomorrows.

Colorado Association Holds Convention, Changes Name.

What was formerly known as the Colorado Light, Power & Railway Association has changed its name to the Colorado Public Service Association. This was done so as to permit the admittance of gas companies and other public utilities.

At the nineteenth annual convention held at Glenwood Springs, September 11-14, W. C. Sterne, the chairman of the Rocky Mountain Committee on Public Utility Information said that Colorado, New Mexico and Wyoming are now engaged in making improvements that will cost $4,000,000 and, of course, such a large expenditure will help the states materially. Ben. S. Read, president of the Mountain States Telephone & Telegraph Co., read a paper on "Communication," which was well received.

Plans for the betterment of the public and the utilities that serve them were formulated and with that end in view the association will put forth its best efforts during the ensuing year.

In the election of officers W. F. Brown, traffic manager of the Mountain States Telephone & Telegraph Co., was made president. For the division that will handle the electric light features, J. F. Dostal of the Colorado Springs Light & Power Co. was elected president.

Iowa Association Preparing for State Legislation.

At the winter meeting of the Iowa legislature there will be considered prospective legislation of great importance to the telephone industry, according to the announcement of Chas. C. Deering, secretary of the Iowa Independent Telephone Association.

So that the members of the association may be prepared for and may be aware of all developments, Mr. Deering is urging everyone to make it his business to attend at least one of the following district meetings: Denison, October 10; Orange City, October 11; Emmetsburg, October 12; and Fort Dodge, October 13.

Missouri Association to Hold Annual Meeting in November.

The annual convention of the Missouri Telephone Association will be held in Jefferson City, November 15 and 16. R. W. Hedrick, secretary of the association, has made the announcement of the dates of the meeting in plenty of time for every member to make arrangements to attend.

What Is Your Company Doing?

Chats About Company Doings.

By Stanley R. Edwards.

The University of Illinois has been convinced of the desirability of offering a curriculum in public utilities with the idea in mind of preparing young men with a knowledge of the theory of public utility management and the problems involved. A four-year course of studies has been laid out by the university authorities to deal particularly with the administrative, legal and economic sides of the business.

The tentative course in the first year includes the principles of accounting, economic resources and economic history of the United States. In the second year advanced accounting and auditing, principles of economics, political science as relating to the national government and the state and local governments, money and banking, business organization and operation and business writing are treated.

In the third year, business organization and operation, commercial law, corporation management and finance, the transportation system of the United States, and freight shipment are studied. In the realm of political science, municipal government and the constitutional element of social and industrial problems are taken up. In the fourth year the student takes up the principles of public utilities, public finance, labor problems and labor organization, municipal problems, and labor legislation.

These courses are to be opened to the academic and engineering students and it is proposed to have a series of addresses to the freshmen and juniors on the romantic side of the public utility industry. Arrangements will be made so that students may be employed by the public utilities in vacation periods and after their graduation.

Other universities in Illinois, particularly Chicago and Northwestern, will undoubtedly adopt comprehensive courses in public utilities.

Back of the announcement that the universities in Illinois are making provision for courses in public utilities is the work which has been done by the utilities and utility organizations. Last May, A. C. Littleton, representing the dean of the college of commerce, University of Illinois, discussed with the directors of the Illinois Telephone Association the desirability of inaugurating a course on public utility management.

Other utility associations also were engaged in efforts seeking the establishment of public utility courses and the result was a general conference with Dean Charles M. Thompson of the School of Commerce and Business Administration, University of Illinois, and Dean Ralph E. Heilman of the School of Commerce, Northwestern University, the representatives of the utilities being John F. Gilchrist, vice-president, Commonwealth Edison Co.; Britton I. Budd, president, Chicago Elevated Railways; George R. Jones, secretary, Northern Illinois Public Utilities Co.; B. J. Mullaney, director of Illinois Committee on Public Utility Information; R. V. Prather, secretary-treasurer, Illinois State Electric Association; Charles A. Monroe, vice-president, Peoples Gas, Light & Coke Co.; C. W. McRea, chief engineer, Illinois Bell Telephone Co., and Jay G. Mitchell, secretary, Illinois Telephone Association.

Having "sold" the university authorities on the desirability of establishing courses in public utilities, the representatives of the utilities are taking steps to "sell" the undergraduate body and to keep them "sold" by thorough co-operation with the university authorities in every possible way.

The importance of this movement may be gauged when it is realized that the telephone companies in the state of Illinois, alone, require approximately 150 to 300 trained young men in their regular organizations.

"Windows That Talk 'Telephone' to Millions" is the latest advertising stunt of the New York Telephone Co. Show windows in 21 of the company's commercial offices in New York and Brooklyn constitute 21 different stages on which is presented an educational tableau each week. In this manner, the thousands in the constantly moving audience are informed of some phase of the telephone business.

These stages afford a "theatrical circuit" of 21 weeks, which is handled by a "booking agent" and "stage manager," whose efforts, among other things, are directed toward giving these vast audiences a new, clean and interesting performance each week.

Although the main "circuit" revolves around Greater New York, plans have been made to extend it through the entire territory of the company.

The audiences number into the thousands daily at each "stage" and the aggregate for the week over the entire circuit runs into the millions. And each of the spectators who pauses to look, even though momentarily, learns something new about the telephone business.

The New York company considers keeping the circuits in motion and providing the performances one of the most important functions of its publicity and educational work. It is handled by a special section of the copy department, which is the production branch of the publicity department. Men trained in the art of catching the public's eye and holding its interest conceive, execute and distribute the window displays which New Yorkers have seen on the "stages" of the company's offices.

Each display travels the circuit by motor truck in time to open a new performance at the next theater on Monday or Tuesday. When the final week has been played, the stage set is either rebuilt into a new idea or goes to the warehouse to await future call.

Through these window displays many thousands have learned what the inside of a 1200-pair cable looks like. They have had told to them the story of the complexity of developing and expanding a telephone system. At times the company's buildings in Greater New York have been marshalled across the stage; and in other instances young women have heeded the call to become an operator through a window exhibit in one office or another.

The "shows have brought returns in the form of dollars and cents by helping to secure advertisers for the directories and

The District Conference of the Minnesota Telephone Association Held September 12 at Erskine, the Home Town of Thos. Vollom, One of the Association Directors, Attracted a Good Attendance.

increasing the use of toll lines—this, in addition to increasing the good will that comes from understanding.

Most of the displays are designed solely to promote the use of the telephone and to secure advertisers for the directory, but occasionally a special display is prepared in which there is no commercial touch. In this class are exhibits calling attention to the significance of the national holidays—Memorial Day and July 4th, for example.

It is necessary for the company to construct four displays a week. Usually they are built in pairs, one being shown in the New York offices while the other is making the rounds of the Brooklyn branches.

When the new telephone directory of Cleveland, Ohio, was issued recently, the Cleveland Plain Dealer decided it was worthy of a book review on the weekly literary page. Here is the review:

New Book Is Rich in Characters, But Deficient in Plot.

"Cleveland Telephone Directory—The Ohio Bell Telephone Co., Cleveland.

It is to be regretted that the author of this instructive volume has seen fit to hide his identity behind the curtain of anonymity. There can be no question that this offering will meet with a hearty reception and that, in Cleveland at least, it will be perused not once but many times.

Throughout, this volume is a strange admixture. There is a marked staccato in the style which the author has made no attempt to relieve. It is short and choppy to a degree, and continuity and interest are pronounced by their absence. Questionable technique is exhibited in the introduction of so many characters at the expense of plot. Still, with the material at hand, it is difficult to suggest how this might have been avoided.

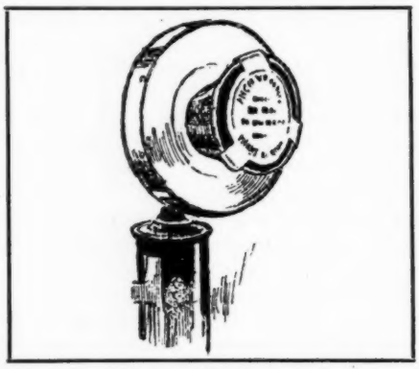
On the whole, this book may be listed as a volume for occasional perusal rather than one to be consumed at a single sitting. That its success is assumed finds further confirmation in the fact that preparations already are under way for the publication of another and even more pretentious work by the same writer."

Telephone companies from time to time have trouble with devices which are placed on telephones by subscribers as an aid to transmission. Sometimes these devices are in the form of advertising novelties as was the case recently in one of our larger cities.

The telephone company officials were in "good" standing with the newspaper people, and when this advertising novelty for attachment to the transmitter mouthpiece appeared, the newspaper man had the paper's artist make a sketch of the device which was published in a story quoting the company's superintendent. Here is the story, which appeared as a "news story" under the heading, "Phone 'Vibrator' a Muffler—Disc Sold Here as 'Amplifier' Slowing Down Service, Company Says":

"Telephone service here is being hindered, telephone company officials say, by a small novelty being sold to business firms and distributed to the public for use on telephones.

"It is a small tin disc which is clasped over the mouthpiece, leaving a space of scarcely a quarter of an inch around the



The Newspaper Published a Drawing of the Device.

edge for the sound of the voice to enter the transmitter. The disc carries an advertisement of the distributing firm.

"'The instrument interferes with rather than aids in hearing,' said the commercial superintendent of the telephone company. 'The voice strikes the so-called diaphragm and rebounds, instead of entering the transmitter and striking the diaphragm in it.

"'No instrument is needed to heighten the sound of the voice if one talks properly into the transmitter. The lips should be a half-inch from the mouthpiece and the voice should be directed straight into it.'"

Recently a British writer—Frank Hillier—in the London Daily Mail had this to say of the Yankee telephone operator.

Courtesy and intelligence, and persistence rivalling that of the bulldog, are the chief characteristics of the United States long distance telephone operator.

For instance:

While in New York, I had occasion to communicate with a certain man in Washington. I only knew his name and the name of the apartment building but that was quite enough for Miss Long Distance.

"I will find the number," she said. "Who's calling, please?"

I gave her my number.

"What is your name, please?" she asked. Thinking how nice it was to be thought of as a person and not merely a number, I imparted the information.

"All right, Mr. Hillier," she replied, "I'll call you."

Five minutes later she was back again.

"Mr. Dash is out and he is expected back at three o'clock," she said to me.

"Shall I call him again at three o'clock?"

"Yes, please, if you will."

At five minutes past three Miss Long Distance's pleasant voice is heard again.

"They say now that he telephoned that he would not be in until tonight," she told me.

My disappointment must have sounded in my voice as I thanked her, for she went on at once, "Is it very urgent?"

"Yes, I particularly want to get him today," I answered.

"Have you any idea where he might be," queried Miss Long Distance. I said I had not—not the slightest—and prepared to ring off.

But Miss Long Distance hadn't nearly finished.

"Where shall you be tonight?" She asked.

"I'm afraid I shall not be at home," I said.

"I can call you anywhere you like," she said, not in the least dismayed.

"Well, I shall be dining at Astorbilt 4488, Mr. So-and-so's apartment," I told her. "After dinner, I believe, we are going to the theater."

"Which one?"

"I'm afraid I don't know," I confessed. "The play is 'Sally'—I know that."

"Never mind, I'll look it up. And I shall call you."

Soon after the beginning of the second act of "Sally" that evening an usher touched me on the shoulder (I had left my name at the box-office) and said, "You are wanted on the telephone, sir."

"Is this Mr. Hillier?" asked Miss Long Distance, still pleasant and unruffled, when I took up the receiver. "I've got Mr. Dash for you."

When I had finished with Dash, he said, "By the way, how did you know I was in here?"

"I didn't," I told him. "Where are you?"

"I'm in the Turkish bath," came the reply. "How on earth did you find out?"

"I didn't," I answered. "It was Miss Long Distance."

And I am still wondering how she did it.

Whenever we boost our state, we boost our business and when we boost our business we help our state. Words to this effect were heralded by W. J. H. Horan, president of the Colorado Manufacturers & Merchants Association. When the time drew near for the convention which was held at Sterling, Colo., September 15-16, Mr. Horan in an open letter to business builders of Colorado, stated:

"An association is only what its members make it and only with the co-operation of its members can an association be a powerful factor. Therefore let's get together at least once a year and use our ability, resourcefulness and experience to bring adequate solutions for the development of our state.—Let's go to Sterling!"

Talks by Iowa Telephone Operators

The Report Charge and When It Should Be Made—Work of the Long Distance Recording Operator—Points Which Should Be Watched by the Toll Operators—Papers Presented at the Recent Operators' Schools in Iowa

Report Charges.

By Miss Anna Kruse, *Charles City, Iowa.*

Report charges are partial charges made under certain conditions on incompleted person-to-person messenger, appointment and collect calls.

A report is not chargeable unless it is given the calling station within the limit time, which is one hour from the filing time, if one filing time entry appears, or one hour from the filing time entry encircled, should another be on the ticket.

Only one report charge shall be made on any one call.

In no case shall a report charge be made in addition to the message charge.

The new toll practice permits the use of the original ticket if, after a subscriber has canceled a call, he asks to have the call tried again, or if a *WH* is received from a distant station, he agrees to talk—these calls must be received before midnight of the day on which they were filed.

When, for some reason, a call on which there would be a chargeable report cannot be completed the day on which it is filed and there is a possibilty it may be completed during the night or on a future day, if the calling station agrees to talk later, the original ticket shall be carried forward and no report charge assessed, provided the call is completed before midnight of the specified day.

Calls which are still active at midnight will be plainly marked with the (ag time) or (ag date) in the special instructions space.

A report charge shall be made on an appointment call if, after an appointment has been definitely arranged for with the called station, the patron requests that the appointment time be changed or that the call be completed as a person-to-person call. A new ticket shall be made and a report charge assessed on the original call.

A report charge shall be made for the following reports: *BNR, DS, FC, FN, FO, HO, LK, LKLF, NF, NRG, NRGCF, PN, TDS, U, UD, UN, UX, WTWTLF,* Room Telephone *BY, DA,* or *OD.*

Called party refuses to talk.

Charge not accepted (on collect calls).

Calling party refuses to talk.

Calling telephone does not answer.

Calling party requests no report except *WH* be given him.

Calling party cancels messenger call after arrangements have been made to notify cal'ed party.

Other reports not covered by code which are authorized by the supervisor.

No report charge shall be made for a report of *DA, OD* or *BY* if received from the distant office.

If we are unable to give a chargeable report to the calling station because the calling line is busy or out of order.

If an employe is in any way responsible for an incorrect report.

If where a report is given to the calling station, the calling party has already talked or is talking.

If the calling party cancels call before a report has been given or a report that the connection is ready.

If the message charge has been canceled because of unsatisfactory service.

If upon the receipt of a *WH* report or leave word calls the original ticket cannot be found.

On an appointment call when the call is not completed within 30 minutes of the appointed time due to a delay in establishing a circuit, provided the call has not been canceled within that time.

If messenger service cannot be furnished when an *NF* report has been given and the calling station wishes a messenger sent.

There are several patrons who do not understand the report charge although it has been extensively advertised.

Employes should be careful to explain that the report charge will be deducted if the call is completed later and the reason for the charge when necessary.

Records.

When a subscriber asks for "long distance," he is connected with the long distance recorder over a recording trunk. The subscriber expects to reach the long distance recorder promptly, and the recorder may save time and answer more promptly by holding the plug in right hand.

Attitude Toward Subscriber.

A recording operator is the first long distance operator a subscriber reaches, and as first impressions are likely to be lasting, the service as a whole may be entirely misjudged through inefficient work in recording a call.

Try to impress the subscriber favorably by being courteous, proving to him by our speech and manner that we are ready to give prompt and cheerful service, and make the subscriber feel that his call is receiving personal attention. Address him by name whenever it seems natural to do so.

A "please" and "thank you," as words of courtesy, help wonderfully and always make a subscriber feel at ease when placing a call. Never interrupt to verify while a subscriber is placing a call—that is, do not talk while he is talking. After obtaining the necessary details, thank him for the order, and dismiss him in order that he will understand that he will not have to wait at the telephone while the call is being completed.

Accuracy.

You know from your experience in using the telephone how important it is to give the operator the number clearly and distinctly in order to avoid reaching a wrong number. Numbers heard over the telephone are not as easily understood as those spoken face to face. A number is either right or wrong; therefore careful attention must be given to avoid mistakes, as far as it is possible.

Wrong numbers given not only reflect on the service we give, but are also a waste of time in effort, and in the use of toll circuits. Important aid in accuracy in passing numbers is the use of the rising inflection. Accuracy on the part of the recorder also saves time for the line operator.

Verification.

Numbers should be repeated, unless we are certain we understand them. Numbers require special care since the completing of calls depends largely on having correct numbers. If you do not understand a name or number when the subscriber first gives it, ask, "What name, please?" or "What number, please?" If not corrected, enter the item as you understand it. If you do not understand the intials or the name, spell the name or repeat the initials.

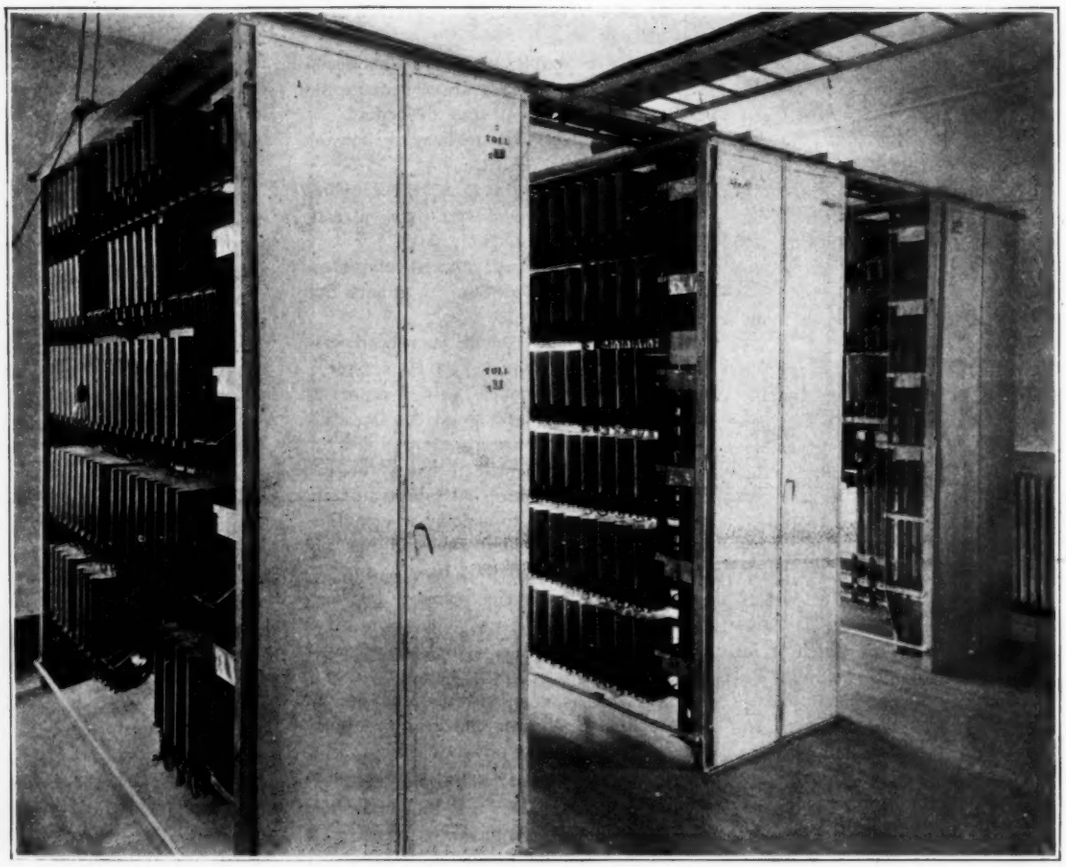
Enter the details given by the subscriber, verify the items you are not sure of, or obtain the ones you have omitted. In all cases make the verification in such a way as to cause the least delay, and with as little annoyance to the subscriber as possible.

Since another operator is to complete the call, you should be careful that the tickets are made out carefully, so that they may be easily read and the information on them be accurate and unmistakable. Do not erase or write over a mistake, make corrections by drawing a line through the wrong item, and re-write it.

Entries on Tickets.

Each entry on the ticket should be made on the extreme left of the ticket so that if any changes or corrections are necessary, there will be sufficient room on the ticket. Writing on the tickets should be small and neat, and letters or numbers should not extend over the spaces.

If the subscriber does not offer the name of the place he wishes to reach, the recorder should ask: "What place do you



The automatic exchange at Elyria, Ohio, illustrates the remarkable flexibility of Strowger equipment. In this exchange the classes of service given include individual line, two party line and four party line service using harmonic ringing, P. B. X. trunk service (automatic selection), rural service, and full automatic reverting call service on all rural and party lines.

Our engineers will be glad to study your needs and explain how you may profit by automatic operation. No obligation.

Time-Proven Flexibility

Companies that use Strowger Automatic equipment are in no way restricted as to the kinds of service they are able to offer their subscribers; nor are they limited to any one method of rendering any particular class of service.

Every Strowger Automatic switchboard is designed to meet the needs of the company for whom it is installed, and may be changed at will as new traffic or service requirements may develop.

With Strowger Automatic, any class of service may be rendered and any desired method used,—and all services and all methods are time proven through years of actual operating experience.

Automatic Electric Company

FACTORY AND GENERAL OFFICES: CHICAGO, ILLINOIS

BRANCH OFFICES:

New York City, 21 East 40th St.
Cleveland, 415 Cuyahoga Bldg.
Philadelphia, The Bourse Bldg.
Columbus, 518 Ferris Bldg.
Boston, 445 Tremont Bldg.
Rochester, Mercantile Bldg.
Detroit, 525 Ford Bldg.
Washington, 905 Munson Bldg.
Cincinnati, Union Central Bldg.
Los Angeles, 238 San Fernando Bldg.
Pittsburgh, 608 Fulton Bldg.
Kansas City, 1001 New York Life Bldg.

ASSOCIATED COMPANIES:
INTERNATIONAL TELEPHONE SALES AND ENGINEERING CORPORATION, New York
International Automatic Telephone Company, Ltd., London
Compagnie Francaise pour l'Exploitation des Procédés Thomson-Houston, Paris
Automatic Telephone Mfg. Co., Ltd., Liverpool
Automatic Telephones, Australasia, Ltd., Sydney

The dial is a boon to both subscriber and operating company. To the former it means better and more reliable service; to the latter a proper and certain net profit.

wish to reach, please?" If the subscriber does not specify the state in which the called place is located, and you think this information is necessary, ask: "In what state is ———— (called place), please?" Enter the abbreviation for the state in the state space.

If the calling party's name is not offered, ask, "What is your name, please?" Should he refuse to give his name, enter *RN* in calling person space. Oftentimes a subscriber calls for a particular person, but says he will talk with another, if first person is not there or unable to talk. Enter both names connecting them by "or" (Harris or Jones). If the calling party's name has not been obtained, dismiss him by saying, "Thank you, we will call you," not forgetting our courtesy at all times.

In case a subscriber does not give a particular name but says he will talk with the manager or the buyer, it should be entered in the person space and the call treated as a person-to-person call.

If in any case the telephone is not listed in the name the subscriber has given, verify the name or ask, "Under what name is the telephone listed, please?" and enter the information obtained.

When in doubt whether the subscriber has given a station-to-station or person-to-person call, ask: "Do you wish this to be a station-to-station or person-to-person call?"

If the subscriber is not familiar with the difference in calls, explain to him and point out that the rate for person-to-person is higher than station-to-station."

The line operator is not always successful in completing a call at once and the subscriber often wishes to have another attempt made on it before she has had an opportunity to try it of her own accord, or he may wish to give further instructions. Operators should always show their willingness to do all they can to complete the call.

We have report tickets which have necessary codes for reports on calls. If none of the codes covers the case, enter the information in the remarks space. Always make the subscriber feel that we are interested in his call. In recording a call on a report ticket write enough on the ticket so you can complete it without holding him on the line, and finish the recording when you have dismissed him.

In case a subscriber does not make it plain whether or not he has placed a call, in asking for a report on a call, say, "Have you already given us your call?" Do not write a new *out* ticket on a call which has already been recorded.

For various reasons, the subscriber sometimes orders his call canceled, and a canceled call represents no revenue, or much less revenue for the company. We should, therefore, aim to avoid as many canceled calls as possible. Our own judgment should guide us whether or not to ask a subscriber if we may complete his call later.

If a subscriber reports that long distance called him and he's ready to talk now but does not volunteer his name or the name of the station, ask, "What is your name, please?" or "What place called you, please?" Dismiss him by saying, "Thank you, we will call you."

Occasionally a subscriber makes a report of a "cut-off" on a long distance call; the recorder should make a report of this, drawing a line through "cut-off" on the report ticket and send it to the proper operator.

Many calls are placed from pay stations where there are no attendants. In such cases, after recording the call, the recording operator should say, "Thank you, Mr. Jones, please have the correct change ready; we will call you."

Upon a request for the call to be made collect, say, "Charge collect? Thank you, Mr. Jones, we will call you." If collect, make note by entering "col" in the note of collect space.

A subscriber sometimes wishes to make an appointment call. On calls of this kind enter the time of the appointment in the "Mg—Apt" space, so that the line operator will know how to proceed with the call.

Messenger service is often necessary on a call. After the subscriber has authorized a "Mess" charge, cross out "Apt" in the special instructions' space, and write *LW* after *Mg*, if the subscriber wishes messenger to leave word. If he does not wish the messenger to leave word, write *Ca* after *Mg* in the special instructions' space.

If the calling party places a call for a person and specifies he can be reached at one or more places, record one ticket, entering the first station named, and write "over" in special instructions' space; then write the names of the other cities or towns and where to locate the party, on the back of the ticket.

Sequence Calls.

Subscribers often file two or more calls, either in the same or different places, to different parties. These are called "sequence calls," to be completed one after the other. Designate all sequence calls by entering "Seq" in the special instructions' space. and placing filing time on the last call only, also entering the number of calls on the last call, in the special instructions' space.

All emergency calls should be referred to the supervisor and prompt and careful attention be given them.

We should always try to please our patrons to the best of our ability, always trying to give prompt and courteous attention. Aim to make our service good, better, best—and may we never rest until our good is better and our better best.

CAN YOU TAKE CRITICISM?

There is no truer test of a man's qualities for permanent success than the way he takes criticism.

The little-minded man can't stand it. It pricks his egotism. He "crawfishes." He makes excuses. Then, when he finds that excuses won't take the place of results, he sulks and pouts. It never occurs to him that he might profit from the accident.—Thomas A. Edison.

Examination for Inspector of Signal Corps Equipment.

A competitive examination for "Inspector of Signal Corps Equipment" has been announced by the United States Civil Service Commission. Other positions to be filled from this examination also are vacancies in the signal service at large, Governors Island, N. Y., and Washington, D. C., at $1,800 and $2,400 a year, as well as positions requiring similar qualifications, at these or higher or lower salaries. Regarding the other positions, there is a provision that they may be filled by reinstatement, transfer, or promotion, if it is found in the interest of the service to do this.

Applicants must show that they have graduated from a full four years' high school course or completed at least 14 college entrance units. In addition, they must have had at least three years' experience in the manufacture, testing, and installation of telephone, telegraph, or radio equipment. It is preferred that this will have been with the signal corps or for a house which has manufactured, tested, or installed such equipment for the signal corps.

The successful completion of each year of an electrical or mechanical engineering course in a college or university of recognized standing will be accepted as equivalent to not more than six months of the required experience. Other scientific courses along allied lines will obtain credit for not more than four months of the required experience.

Those desiring to apply for examination for this position should send in their request at once for form No. 1312, as all applications must be turned in on or before October 17. They may be obtained from the Civil Service Commission in Washington, D. C., or in any of the various cities in which the commission has offices. The exact title of the examination, "Inspector of Signal Corps Equipment," should be stated in the application form.

Up-State Association Changes Date for Syracuse Meeting.

It has been found necessary by the Up-State Telephone Association of New York to change the dates of the Syracuse district meeting, which was scheduled for October 18 and 19. The new dates are one day earlier—October 17 and 18. The place remains the same—Onondaga Hotel, Syracuse.

Cedar—the Serviceable Pole Timber

Comprehensive Explanation of Points to Be Considered in Selecting Pole Timber — Comparison Between Northern White and Western Red Cedar Timber—A Detailed Discussion of the Various Methods of Pole Preservation

By Hart Anderson

Advertising Manager, Page & Hill Co., Minneapolis, Minn.

In the selection of timber for pole use, there are several important points to be considered. The first is natural resistance of the wood to decay; others are strength, light weight, easy handling, economy, and non-conductivity.

For the present let us deal with wood values alone, leaving the question of butt-treating for later discussion. According to statistics issued by the United States Department of Agriculture, 70 per cent of the timber used for pole line construction is either northern white or western red cedar. The fact that so many public utility companies have standardized on cedar is apparent proof, it is said, of its worthiness as pole timber.

Why Is Cedar Decay Resistant?

Cedar contains a combination of chemical elements which are in themselves highly resistant to the action of fungi, or in other words, the plant life which destroys or breaks down the wood fiber.

The non-absorbency of cedar is also a factor in its decay-resisting quality. Alternate dampening and drying out, in itself highly inductive to the rapid decay of wood, is made negligible in cedar by the non-absorbent quality of its seasoned wood. The reason that cedar absorbs but little moisture is accounted for by the conditions under which it grows.

Cedar is unusually dense and close-grained. This attribute makes a wood that is highly resistant to absorption of moisture, and inasmuch as moisture is one of the chief elements which is necessary for the growth of wood fungi, the lack of it in cedar minimizes the chances for propogation and growth of these wood destroying fungi.

The following are a few instances which prove long life for cedar poles:

Cedar poles in the lines of the Southwestern Bell Telephone Co., east from Rauschenbach and St. Louis, Mo., set in 1892 are still giving service. In 1899 the Home Telephone Co. built a line running out of Wabash, Ind., carrying three ten-pin cross arms. A recent examination showed that these poles were still good for years of service.

In 1898 the Chicago Telephone Co. constructed a lead of 40 ft. poles. These poles are still in service. In 1896 the Winona Telephone Co. built lines running out from Knox, Ind., of cedar poles carrying ten-pin cross arms. These are untreated cedar set in sandy soil. The poles, the company says, are still good for years of service.

Up in the North Woods Snow Plows Are Part of the Equipment Used in Getting Out Northern White Cedar Poles.

The best testimony of the desirability of cedar for pole use is the fact that more cedar poles are used for pole line construction than any other type of wood. This statement is taken from the records of the United States Department of Agriculture.

Now let us consider the next important point in determining the best type of wood to be used for pole timber, namely, strength. In this connection we will consider northern white cedar and western red cedar poles separately.

In northern white cedar, the liberal proportion of taper of the pole is the cardinal quality of strength. Nature has grown this tree with an unusually stocky butt to give it firm anchorage in the moist ground in which it ordinarily grows; also to resist the severe storms that occur in the northern climate where northern white cedar is found. This taper of one inch in five feet provides the greatest strength at the point where danger of breakage is the greatest.

Western red cedar is not as heavily butted as northern white cedar because of the conditions under which it grows. Its taper is not as great. It, therefore, has a smaller ground line circumference, in comparison with northern white cedar poles of the same size top.

This difference in ground line circumference is largely off-set in the western red cedar by the fact that its tensile strength is greater than northern white cedar, the ratio being approximately 6,600 pounds per square inch for northern as compared with 10,000 pounds per square inch for the western.

These then are two important factors in determining the best type of wood to use for pole line construction, namely, long life and strength.

Economy is the third big point. Long life and strength, the first two items discussed, obviously come under this heading, when per annum costs are figured up. There is still another point, that comes under the heading of economy, which must not be omitted.

In addition to great durability and strength, cedar is one of the lightest of woods. Its specific gravity in the seasoned condition is approximately 0.29.

It is, therefore, easy to see that the light weight of cedar is an important factor in keeping down costs of erection in the lines after poles have been laid down at the shipping point. The amount of time and labor saved in unloading them and loading them aboard trucks and wagons and haul-

Ice Roads Facilitate the Hauling of Poles. These Roads Are Built With the Aid of a Combined Snow Plow and Rutter.

The Caterpillar Steam Hauler Has Supplanted Horses, in Many Cases, for Hauling the Poles from the Woods to the Railroad Tracks.

ing them to their places in the line, over the cost saved in the use of heavier poles, has been an item, it is stated, that has decided in favor of cedar on a number of large sales contracts.

Hazards to workmen must never be forgotten in the consideration of timber for pole line construction. As has already been stated, the wood of cedar is naturally dense and close grained and, therefore, does not readily absorb moisture. For this self-apparent reason, the wood maintains maximum non-conductivity of electricity.

Any pole with much moisture in it has a great attraction for lightning. While it is impossible to find a pole that is positively immune to lightning, it is needless to say that the number of these particular poles in the line that fall to this destroyer will be far less than poles that have better absorption qualities.

Broken insulators are not uncommon in transmission lines. In such cases the non-conductive properties of cedar are highly valuable as usually current deflation and line losses will be negligible until repairs can be made. Without moisture in the poles, the workmen are seldom grounded on the pole and subjected to sudden electrocution.

Let us briefly then summarize the qualities of cedar which make it a most desirable wood for pole timber.

First, the pole user wants to invest in poles and does not want to speculate. Cedar, as has been explained, has natural decay-resisting qualities. It has correct proportionate size at the ground line. It has great tensile strength. All of these attributes make cedar long lived. Cedar by its years of service the country over, has proved its serviceable qualities. This is not based on speculation but on actual use.

Second, transportation and handling costs must be at a minimum. Cedar is light and easy to handle.

Third, the best pole must be a non-conductor of electricity to make it safe to work on, to prevent tie-ups in the system in case of broken insulators, and to keep lightning destruction at a minimum. Because of its resistance to moisture, cedar remains in all kinds of weather negligibly non-conductive.

For these reasons many pole users over all parts of the United States have adopted cedar as the standard of their lines.

As in any other business, the successful operation of a transmission or telephone system is dependent upon making every dollar work to 100 per cent efficiency and the public utility company giving as near 100 per cent efficient service to the consumer or subscriber as is possible through continuous and uninterrupted service.

The cost of any line is usually figured on a per annum basis and, therefore, the longer a piece of equipment holds up, proportionately less will be the per annum cost of the line. Reducing this per annum cost by lengthening the life of the poles in the line brings us logically into the subject of pole preservation.

Pole Preservation.

Notwithstanding the fact that history relates that as early as 400 B. C., efforts were made to preserve timber, pole preserving on a commercial scale is a comparatively new venture. However, within a short time, the theories and practices of pole preservation have moved forward by leaps and bounds and the thinking men in the public utility field no longer hesitate or question whether butt-treating is advisable.

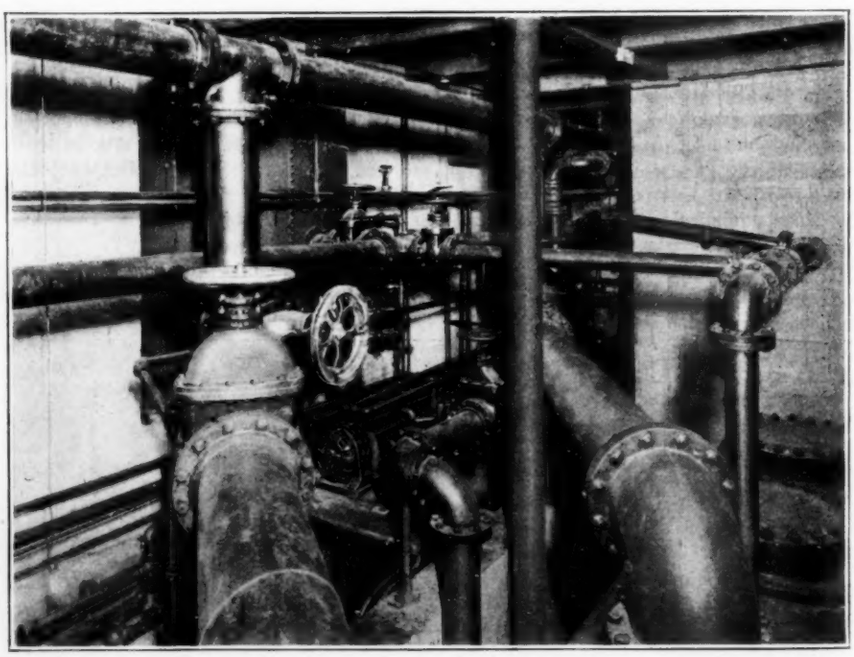
So much has been said of what causes decay that we will not stop for a lengthy discussion of this particular point. We will pass over it by simply stating that decay is caused by a low form of plant life which attaches itself to and grows in the wood. This plant in order to thrive must have, in addition to certain chemical elements contained in the wood; heat, air and moisture.

It is only by depriving these plants of one of these elements that the destruction they cause can be prevented.

It is sufficient to say that these plants cannot live in wood which has been saturated with creosote oil. Experience if nothing else, has proved this point.

To show that every thinking man in the public utility industry realizes the importance of butt-treating can be clearly shown by the fact that in 1900 the number of poles which were treated with any kind of preservative were practically negligible. Today it would be safe to state that approximately 75 per cent of all the poles purchased annually throughout the United States are receiving treatment with some type of preservative.

The natural decay-resisting qualities of cedar make it unnecessary to treat that portion of the pole above the ground-line



A Partial View of the Underground Portion of a Butt-Treating Plant. Very Little of the Plant Can Be Viewed from Above Ground.

section. To completely protect cedar against decay, it is necessary to impregnate with the preservative only that portion just above and below the ground line, because it is in this section that air, food, heat and moisture unite to form the most favorable conditions for the propagation and growth of these wood destroying fungi.

The pioneer in pole preservation is the brush treatment. The chief disadvantages of the brush treatment are:

First, the preservative cannot be thoroughly introduced into the checks within the treated area; second, the lack of uniformity of penetration; and, third, the lack of penetration.

Every pole user knows that these are the primary essentials in the successful preservation of poles.

If the sapwood of the ground line area can be impregnated with the preservative and thus be rendered immune to decay, the heartwood will remain in good condition.

For many years the theory has been that heart-rot in the pole did not progress after the tree was cut. There are, however, some authorities who are inclined to believe that there is rot progression in the heartwood of poles in some soils. Extensive experiments, however, have shown that in the open-tank method of butt-treating, the center of such poles is so thoroughly saturated with the preservative that any possibility of further rot is eliminated.

The Open-Tank Method.

This brings us to the open-tank method which is the one commonly used for the preservation of cedar poles. In the open-tank treatment, the type of preservative may vary but this also has become practically standardized, the preservative being a high-grade coal tar creosote.

One of the open-tank methods, known as specification *A*, is now employed only to a limited extent. Under specification *A* carbolineum is used instead of creosote. Numerous tests have shown that specification *AA*, the creosote treatment, is equally efficient.

In both of these treatments the butts of the poles are submerged in hot oil for a minimum duration of 15 minutes. If a longer life treatment is desired than can be accomplished under specification *AA*, the latest development is the guaranteed penetration process.

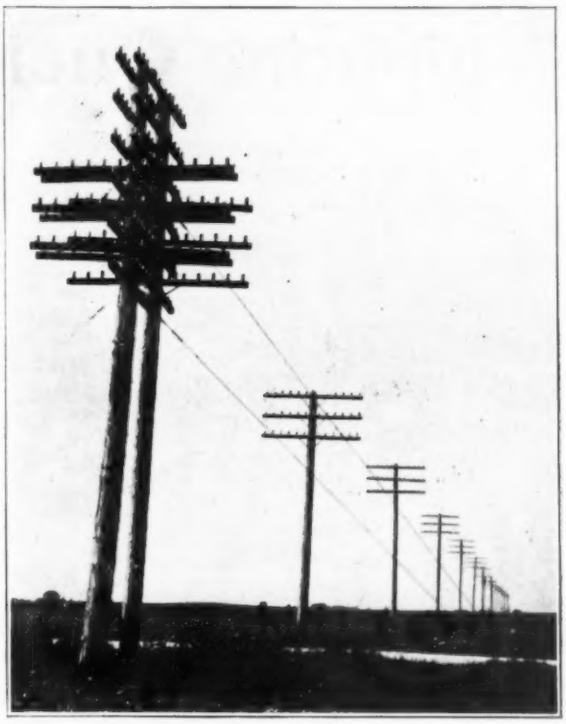
Prior to the innovation of the guaranteed penetration process wherein a definite depth of penetration of the preservative to one-half inch is guaranteed, specification *B* was recognized as the best known method. This called for a submersion of the butts of the poles in alternately hot and cold creosote oil for a minimum period of four hours in the hot oil and two hours in the cold.

The reason that specification *B* is being rapidly replaced by the guaranteed penetration process is because of the fact that under specification *B* the definite depth of penetration of the preservative could not be assured. The reasons for this are: Individuality of the pole, case-hardening, condition of seasoning and other more or less unknown factors.

Under the guaranteed penetration process the complete saturation of the wood to a uniform depth is accomplished regardless of these varying conditions.

As has been stated before, the life of any pole is practically dependent upon its decay-resisting qualities. In turn, the length of time that the life of any pole can be increased beyond its natural life depends upon the depth and uniform penetration of the decay resisting preservatives.

It is plain that a treatment which will produce a uniformly deep penetration will afford maximum protection against decay, resulting not only in prolonging the life and length of service of the poles, but also in reducing the number of poles used annually, a great conservation in the timber supply of the nation as well as a corresponding reduction of maintenance of pole lines.



Lead of Telephone Poles upon Which the Guaranteed Penetration Process Has Been Used.

This method of treatment is obviously advantageous in obtaining longer life for cedar poles.

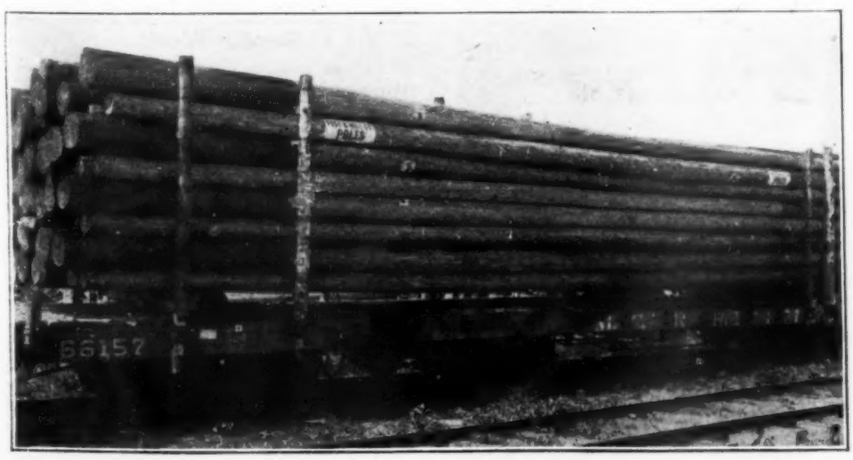
Cedar poles butt-treated by the guaranteed penetration process are now standard equipment with many of the largest public utility companies in the country.

This method of butt-treating poles has been put to such extensive use that it would seem on first thought that the guaranteed penetration process is the one which should be standardized upon by all public utility companies, particularly for permanent lines.

From the preceding discussion then, let us draw our conclusions.

With cedar poles 25 feet and longer, which are to be used in permanent lines, the guaranteed penetration process is most desirable from a standpoint of long life and economy. There is, however, a place for poles butt-treated under specification *AA*.

From a standpoint of pole cost, poles 5 inch 25-foot and smaller, especially when going into lines that are for temporary construction or into lines which may be replaced by heavier construction within a few years, specification *AA* works in on a more economical basis.



Western Red Cedar Tapers Less Than the Northern White. Load of Butt-Treated Western Red Cedar Poles on Cars, Ready for Shipment.

Telephone Queries From the Field

Some Methods of Reviving Polarized 1600 Ohm Ringers.

Can you tell me if there is any way to reclaim a set of 1600 ohm ringers after the core of the coil becomes magnetized?

There are several conditions which result in impaired or total failure in the operation of polarized ringers. By far the most common condition is the loss of the magnetic charge in the permanent magnet of the ringer. This condition can be rectified only by recharging the permanent magnet and involves the use of a recharging device such as a strong electro magnet specially designed or suitable for the purpose.

If the permanent magnet does not require recharging it is sometimes found that the winding has been entirely or partially short-circuited as a result of lightning or high tension line discharges. This condition can only be rectified by a renewal of the coil winding or the removal of the trouble by some other method.

A complete or partial short circuit of the coil winding, in so far as ringing is concerned, may not be shown by simple battery tests owing to the fact that the fault may be of such high resistance as to break down only under the influence of ringing current. A fault of this character may consist of a grounding of the winding on the frame of the ringer as well as a connection between adjacent turns.

Formula for Solenoid with Strongest Possible Pull.

I would like to know the formula for a solenoid that can give the strongest pull for a distance of one inch, using 24-volt direct current or less. I would like to use the solenoids in pairs—that is, two solenoids to one plunger. Will I have to connect them in series or parallel? I would like to have them under 4½ inches long and 3 inches wide.

What gauge wire should be used, and should it be copper or magnetic wire enameled? What size should the tubing be; also what size should the plunger be? What is the best iron to use for the core and the plungers?

The matter of design of a magnet or solenoid hinges on a number of variable factors, such as the ratio of a diameter to the length of winding, the permeability of the iron used as armature, the area and volume of iron used, the kind of insulation on the wire required depending on applied potential and climatic conditions, and others. In general, the magnetic pull depends directly on the number of ampere turns.

In order to determine the proper winding for the specific case under question, we would suggest that you wind the frame with any convenient size wire, noting the number of turns. Then connect an ammeter in series with this coil and, regulating the current by means of a rheostat, pass enough current through it to make it perform satisfactorily, noting the current required. The product of the two gives the number of ampere turns required. Then, from Ohm's law:

$$I = E/R$$

$$I = \frac{E}{R_{tt} \times N \times L_{tt}}$$

$$NI = \frac{E}{R_{tt} \times L_{tt}}$$

where R_{tt} = Resistance of the required wire per foot length.

N = Total number of turns.

L_{tt} = Mean length of one turn in feet.

E = Impressed voltage.

$$R_{tt} = \frac{E}{NI \times L_{tt}}$$

I = Required current. R_{tt} may be found from the wire table; also the amount of current wire of this size can carry without heating excessively. The latter may be calculated by assuming a current density of 1,800 to 2,000 amperes per square inch of copper cross section.

Knowing, then, the amount of current flow, the number of ampere turns divided by this value will give the required number of turns.

No advantage results in static pull by connecting the magnets or solenoids in parallel. Coils are often designed for parallel operation in the case of low voltage (2 to 10 volts) in order to avoid the use of large sizes of wire.

The Reason That Soldering Flux Is Used.

What is the purpose of a soldering flux?

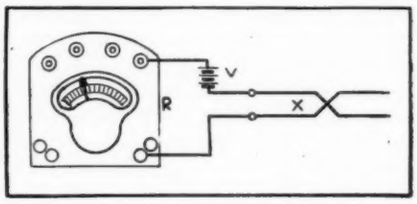
The flux is used to clean the surfaces which are to be soldered and put them in condition so that a good connection can be formed by preventing oxidation. It also causes solder to flow smoothly and makes in general a neat piece of work. There are various fluxes on the market, besides self-fluxing solders.

Measuring Line Resistance With A Voltmeter.

What is the resistance of a line connected to the 15-volt range of a voltmeter when a 5-volt deflection results? We have a Weston volt-ammeter model 280 No. 388. The resistance of the 15-volt range is 792 ohms; the 3-volt, 152; and the 150-volt, scale, 7,920. In measuring a high resistance short is it necessary to have the readings from the same volt pressure on the meter resistance the same, using different meters at each station?

The resistance of the line when a 5-volt deflection is obtained depends upon the voltage of the battery used in the test, which value is not stated in your letter. The test should be made as follows:

The desired range, say the 15-volt range, of the instrument, and the test battery are connected in series with the line to be tested as shown in the sketch. Then the unknown line resistance is



Circuit for Testing the Line.

$$X = \frac{(V - v)\ R}{v}$$

Where X is the unknown resistance,

V = voltage of battery

v = the voltmeter indication with the unknown resistance in series, and

R the resistance of the voltmeter.

For example, assume, V = 15 volts

v = 5 volts

R = 792 ohms

$$\text{then } X = \frac{(15-5) \times 792}{5} =$$

$$\frac{10 \times 792}{5} = 1{,}584 \text{ ohms.}$$

The instrument you have does not have a sufficiently high resistance to measure very "high resistance shorts."

The Switchboard Man's Tools for Repair Work.

Can you tell me the tools a switchboard man requires for ordinary repair work?

Very few are necessary for ordinary repair work, but these tools should be carefully selected and kept in the best condition. Carry small tools in the pocket so that they will be handy at all times. Often these can be obtained in a leather case that will fit the pocket. Necessary pocket tools are:

1 good pocket knife.
1 small short-blade screw driver.
1 pair 5-inch long-nose pliers.
1 pair 4 or 5-inch side-cutting pliers.

Other tools are essential at times, but those mentioned are used more and are the most useful part of the equipment.

Long Beach Cut Over to Automatic

Associated Telephone Co. of Long Beach, Cal., Reports "100 Per Cent Perfect" Cutover—Resume of Its History Shows Steady Growth—Steps in the Actual Cutover and How It Was Put Through Without a Hitch

"The conversion of Long Beach's new automatic exchange has 'gone over' 100 per cent perfect, and the telephone service is now virtually in the hands of the telephone users."

That was the statement given out by the Associated Telephone Co. of Long Beach, Cal., shortly after the "cutting dead" of its old switchboard equipment and the pulling of the insulating strips which separated the new automatic switchboard from the subscribers' lines.

The same day found most of the subscribers of that city dialing their telephone calls with as much ease and confidence as if they had been accustomed to it for years past, and in spite of an unusually

The Main Office Building and Exchange.

severe load, caused largely by subscribers who wanted to "experiment and see how the new system worked," the equipment more than lived up to expectations.

Telephone history at Long Beach began in 1903 when the Home Telephone Co. was organized and opened its exchange with 168 subscribers. The growth of the company continued steadily and rapidly until 1916, when negotiations were completed for the physical merger of the properties of the Home company and the Pacific Telephone & Telegraph Co. This was completed October, 1918, the total number of subscribers, after the elimination of duplicate service, amounting to about 6,600.

During the past four years, the subscriber list has increased to about 13,000, twice that of 1918, showing that the telephone company has lived up to its adopted policy of, "as Long Beach grows, so the telephone industry grows."

A little more than a year ago, the officials of the telephone company, of which Geo. B. Ellis is president and Sam R. Heffley, manager, anticipating the continued growth of the city, began investigations of telephone equipment that would conform most suitably with the promised rapid development. A contract was accordingly made with the Automatic Electric Co.

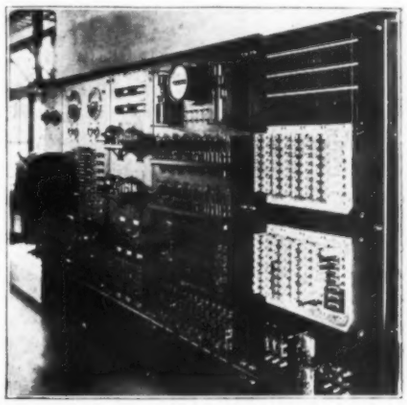
In October of last year, the telephone company began preparations by arranging for the construction of a new main exchange building at Fifth St. and Elm Avenue. Immediately upon its completion, the Associated Telephone Co. established in it its business office.

In May of this year the installation of the automatic switchboard was begun by a crew of men from the Automatic Electric Co. under the supervision of C. M. Sells, chief installer. Through the earnest work of these men and that of the employes of the local company, the installation of the switchboard at the Main office and East (branch) office, as well as the necessary extensions and changes in the outside plant, were completed and everything was ready on the scheduled date.

The actual cutover was begun at 12:30 a. m. on Sunday morning, August 20, and was completed in about ten minutes. The cutover procedure was directed jointly by C. R. Austin, engineer for the Associated Telephone Co., and H. P. Mahoney, superintendent of installation and operation, and James Engh, operating department, Automatic Electric Co.

The first operation was the cutting dead of the manual switchboard in the old Main office at 225 East First St. This was accomplished by cutting the jumper wires at the old main distributing frame. Simultaneously, the jumper wires at the East office were cut, and in both offices connection was then made between the subscribers' lines and the new automatic board.

The final operation was the removal of the insulating strips at the new distributing frames, bridging the final gap between

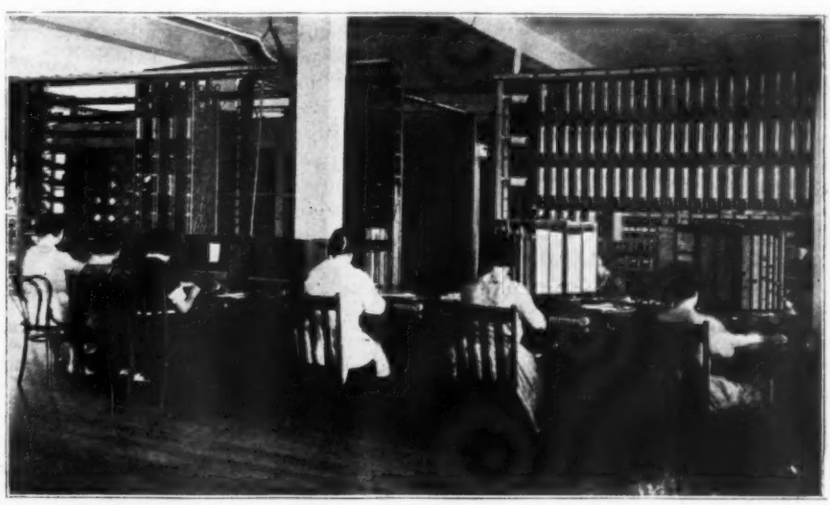


The Power Switchboard.

the telephone subscribers and automatic service facilities. There were, of course, many other details to be considered in connection with the cutover process. All these, however, had been carefully prearranged, so there were no hitches.

From an equipment standpoint there is nothing that can be regarded as unusual, or radically different from other recent automatic exchanges. The Main office automatic switchboard has an installed capacity of 1,300 single lines 2,100 party lines, and 400 P. B. X. trunks. The East office switchboard serves 200 single lines and 1,000 party lines. One hundred one-way trunks connect the two offices. The two switchboards serve more than 13,000

The manual switchboards replaced are both of the common battery type, that at the Main office having been installed about 17 years ago, and recently re-habilitated according to modern manual standards. The East office was established three years ago.



View in the Switchroom Showing Information Operators.

Commissions, Courts and Councils

Discussion and Rulings of State Bodies Having Supervision Over Telephone Companies—Decisions of Courts in Matters of Interest to Public Utilities and Actions of City Councils Relative to Franchise, Rates and Service

Commission and Bell Reach Agreement in Federal Court.

Whether the federal court shall issue a temporary injunction against the Indiana Public Service Commission and authorize the Indiana Bell Telephone Co. to increase telephone rates of the Indianapolis exchange, or shall deny the request for a temporary injunction and await the results of a state-wide investigation of the Indiana Bell the public service commission has decided to make, were questions that were argued before Judges Francis E. Baker of Chicago, A. B. Anderson, of Indianapolis, and George T. Page, of Peoria, Ill., in Indianapolis last week. After a day spent in arguing these questions, an agreement was reached by which the hearing was continued.

The hearing marked the beginning of what is expected to be one of the most important legal controversies over rate making the state has ever had. The three judges manifested a deep interest in the arguments, and from time to time conferred on phases of the case, put leading questions, and now and then expressed tentative opinions.

The Indiana Bell is asking that it be permitted to charge increased rates, pending a final hearing, and to put up a bond to reimburse telephone users in the event the final hearing does not sustain the increased rates.

The Indiana Public Service Commission in the present case is asking that a temporary injunction be denied and that the federal court withhold action until the commission has had time to complete a state-wide investigation of the Indiana Bell and of its relations to the American Telephone & Telegraph Co. and the Western Electric Co., and fix rates it regards as just and reasonable. It is the contention of the commission that the exchanges of the Indiana Bell in Indiana are so interrelated and the Indiana Bell is so related to the A. T. & T. or parent company and to the Western Electric Co. that just and reasonable rates for any exchange can be established only after the whole situation is investigated.

By the agreement the Indiana Public Service Commission is to find what are just and reasonable rates. If it finds rates should be higher than they now are, it is to make up the losses to the company by an amortization process. If it is found rates should be higher, the higher rates are to be received by the company back to August 25, 1922, when the Indiana Bell filed suit for injunction, and the company is also to receive interest on the delayed reimbursements.

This plan was approved by the court, consisting of the three judges, in lieu of the plan of the Indiana Bell to obtain a temporary injunction, increase rates now and give bond to reimburse ratepayers in the event it was eventually found by the federal court the present rates are just and reasonable.

While the commission is to proceed with the investigation, the injunction case is to remain in federal court. It was brought out that if the company should not be satisfied with the action the commission may take, it may return to the federal court.

Under the agreement, proposed by Paul Haynes, one of the attorneys for the commission, the commission is to adopt a resolution in both the Indianapolis case and the state-wide toll case by which the commission is to make rates, and if they should be higher, also by amortization to reimburse the company for the losses from August 25 of this year. The resolution was filed in federal court as a stipulation for the continuance of the application for a temporary injunction.

No temporary injunction is to be granted, at least under present circumstances, and present rates will continue. However, if the commission should ultimately find that higher rates should be granted, ratepayers will be required over a period of years to pay not only the higher rates, after the finding, but enough in addition to pay the company higher rates back to August 25, 1922.

The draft of the stipulation prepared by the commission and filed Saturday, September 30, in the federal court, ordered "that, in conformity with the terms and conditions of said stipulation, said Public Service Commission of Indiana hereby ratifies and approves said stipulation so made in open court, and, in the event the rates so finally determined and established by this commission for toll service of said company and for exchange service in the Indianapolis exchange area, or either of them, shall be higher than those now being charged and collected by said plaintiff company, that said Public Service Commission of Indiana will equitably amortize the difference in rates, tolls and schedules now being charged and collected by said company, and those so ultimately and finally established by this commission, accruing after the 25th day of August, 1922, and up to the date said rates become effective; provided that, if said rates, tolls and charges are ultimately determined by the United States court, then and in that event the commission agrees and consents that such court may amortize such difference, all without prejudice to the right of either party to appeal."

California Commission Authorizes Sale to Pacific Bell Company.

The Tulare Home Telephone & Telegraph Co. on September 20 was authorized by the California Railroad Commission to sell its telephone plant and system, serving the city of Tulare, to the Pacific Telephone & Telegraph Co., and the latter was granted a certificate to carry on the business. The price agreed upon was given as $82,000 plus the cost of additions from April 15 of this year, to the date of consummation of the sale.

The Tulare company has outstanding $15,000 in bonds, $24,900 in capital stock and $10,000 in notes. It was announced by the president that all indebtedness will be taken up by the present owners out of the proceeds of the sale.

Objection of the city of Tulare to the sale was withdrawn when the Tulare company settled with the city a claim of a franchise tax based on the gross receipts. The local utility gave as its reason for desiring to sell the fact that the additions and betterments to the system demanded within the next few years will entail a greater cost than its owners can finance.

Oppose Rate Increase Unless New Board Is Installed.

Following permission of the state railway commission to reopen his former application for an increase in rates, B. G. Miller, head of the Crete Telephone Co., Crete, Neb., appeared before the Nebraska body to press the request. Mr. Miller presented testimony to show that he is not receiving rates that return him any considerable sum on the $107,000 that he and his associates have invested in the plant, which serves 1,180 subscribers.

The application asked for an increase in residence rates of 25 cents a month and a charge of 25 cents for desk sets. He also desired to give his rural subscribers the choice of remaining eight on a line on the harmonic ringing circuit at 25 cents a month extra or being transferred to ten on a line, with code ringing.

Mayor Warkow and several others appeared in opposition to any increase unless it were conditioned upon the purchase of a new switchboard. The service, they said, was not good, and as the manager laid it all on the old board, they insisted that this condition be remedied. If he did that,

Barrett B Carbosota For Preserving Wood

Careful Treatment Insures Results—

Surface treatments are efficient in retarding decay of poles, and result in considerable reduction in the annual cost, when applied carefully and in strict accordance with specifications.

The pole shown in the left hand illustration should have had "*two or more coats applied to that section of the pole extending from one or two feet above, to two or three feet below the future ground line,*" while the pole on the right was not properly "*cleaned of all adhering inner bark.*" With the right hand pole, after a brief period of service, the inner bark loosened, resulting in a break in the film and exposing untreated wood to decay. Due entirely to this exposure, and the improper application of the preservative, the treatment failed to give the required protection.

Barrett Carbosota is the standard preservative for Brush treatment and the Open Tank process. There is no better preservative—it is 100% efficient.

Efficiency of non-pressure treatments depends, however, upon three factors:

1. Proper preparation of the wood before treatment.
2. Proper treatment, in accordance with proper specifications.
3. The use of the right preservative.

Recommendation for creosoting poles, and any other information desired may be obtained gratis by addressing nearest office. Ask for free folder No. 406—"Creosoted Poles are Economical."

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis
Cleveland	Cincinnati	Pittsburgh	Detroit	New Orleans
Birmingham	Kansas City	Minneapolis	Dallas	Syracuse
Peoria	Atlanta	Duluth	Salt Lake City	Bangor
Washington	Johnstown	Lebanon	Youngstown	Milwaukee
Toledo	Columbus	Richmond	Latrobe	Bethlehem
Elizabeth	Buffalo	Baltimore	Omaha	Houston
Denver	Jacksonville	San Francisco		

THE BARRETT COMPANY, LIMITED: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

Pole improperly brush-treated, showing decay and activities of termites (white ants) in less than two years after setting.

Shaving a 6 in.-30 ft. cedar pole preparatory to treatment with Carbosota.

This pole wasn't properly cleaned before treating. Note how bark is peeling and exposing inner wood.

there would be no further opposition made.

Mr. Miller admitted that a new board was needed, and said one would be ordered. Service conditions, he said, were not as he desired them, but that he was willing, if given a larger revenue, to make the necessary improvements. The only jarring note was from a representative of the farmers living west of Crete, who said they would all quit and tie up with Dorchester, if the increase was made. Dorchester is a Lincoln company exchange, and the joke is that it now charges the rate that was objected to for the Crete company.

This is the first increase asked by the Crete company in years. Once before Mr. Miller applied for a raise, but in the hearing defended so well the charges against the service he was giving that he left nothing for the commission to base a favorable decision on. The point made against him that prevented such action was that he insisted his property was in good condition on a 7 per cent maintenance and depreciation setup.

Admit Service Is Better But Refuse to Pay Increase.

While admitting that the service has been improved, the farmer subscribers of the Shawnee County Telephone Co., in Silver Lake and Rossville, Kans., objected to the increase in rates. At the hearing before the Kansas Public Utilities Commission in Topeka, September 21, the attorney for the company declared that they even signed an agreement to strike. The commission took the matter under advisement but recommended that the company and the subscribers get together and agree on a reasonable rate.

Apparently the strike was effective, for a report showed that the Silver Lake exchange had 160 subscribers in August, 1921, and a year later had 146. At Rossville the number of subscribers dropped from 220 to 136, and the Delia exchange had two left out of 40.

The increase made last winter was put in by the company after the commission, which had refused to allow it, had been enjoined by the Shawnee county district court from interfering with the collection of the higher rates.

Approval Given to Merger of Red Wing and Tri-State.

The absorption of the Red Wing Telephone Co., of Red Wing, Minn., by the Tri-State Telephone & Telegraph Co. was given the approval of the Minnesota Railroad & Warehouse Commission on September 28.

In order that the minority of stockholders might be protected, the Tri-State company is required to notify all the stockholders of the price to be paid per share for the majority of the stock and to offer to pay the same price to each minority holder, should he elect to accept that amount and surrender his stock within a period of 90 days from the mailing of the notice.

Upon obtaining control of the Red Wing company, it is the purpose of the Tri-State to consolidate both the local exchange and the toll service.

Further Increases Granted Upon Improving Service.

Having made all but one of the improvements required by the Missouri Public Service Commission's order of March 17, 1922, the Columbia Telephone Co., of Columbia, has now been permitted to establish the increases in rates promised in addition to those allowed in that order. The later order was dated September 26 and became effective October 1.

In the first order the Columbia company was given until October 1 to install certain improvements to the switchboard to the amount of $23,814, and was directed to employ eight new operators on April 1 and to maintain a force thereafter of not less than 32 employes. Both of these provisions have been carried out. Certain improvements in the rural lines, to be completed by October 1, have not been made, delay having been occasioned by the death of the former president of the company. Upon petition, a 90-day extension was granted for fulfilling this portion of the order. The present rates for rural service will continue until the improvements have been made.

Say Increase Not Needed if Collections Are All Made.

George E. Becker of the Pawnee Telephone Co. was placed on the spit of criticism before the Nebrasko State Railway Commission when a committee of business men appeared to oppose his request to increase the business rates in Pawnee City $1 a month.

Mr. Becker made a showing that the company had paid but one dividend—3 per cent—in recent years, and that it had been compelled by the commission, in order to satisfy service complaints, to undertake a rebuilding program that absorbed all other dividends. He had, immediately afterward, as the result of a "city beautiful" campaign in Pawnee City, to expend between $4,000 and $5,000 in taking down his poles in the business section and to place his wires underground, when the new paving was put in. These expenditures still further increased his original investment of $50,000 and necessitated higher rates in order to secure an adequate return.

The business men assailed Mr. Becker's ability as a business man, insisted that he had over $4,000 in delinquent accounts due him on his books, and that if he had made proper effort to collect these, his financing problem would be solved. Mr. Becker said that the amount was correct, but that he had lived in the community for 35 years, knew everybody and he didn't have the nerve to tell subscribers that if they did not pay up he would cut off service.

Commissioner Browne told the business men that the regulatory body was concerned only in giving a telephone company sufficient rates to yield an adequate income, and that it went on the presumption that all of the bill were collected in making its calculations. Therefore, if a telephone manager did not keep up his collections, only the stockholders and not the subscribers had the right to chide him.

The protestants finally were mollified, and the commission took the matter under consideration.

Commission Says Removal Charge Is Ordinary Expense.

Hearings of objections of telephone companies throughout the state to the proposed reduction in removal rates, were held by the Oklahoma Corporation Commission in Oklahoma City September 19 and 20.

According to the commission, a large part, if not all, of the cost of moving telephones is covered by the monthly charge for service, and the collection of an additional amount is profit.

The Southwestern Bell Telephone Co. contends that 95 clerical and mechanical operations are necessary in moving a telephone, and the cost is only partially covered by receipts and that a further reduction will mean an additional loss.

The present charge for changing the address and number of a subscriber is $1.50; for moving a subscriber's telephone, $3.50. An attorney for the Southwestern Bell declared it cost the company $2.88 to change a subscriber's address and number and $5.21 to remove a telephone. Before the war, he said, the removal rates were approximately what they are now, but that during the era of governmental control rates were raised.

Since the war the commission had revised the rates downward. The present move is the second step taken in that direction by the commission.

Final Hearing on Cumberland Case in Tennessee Delayed.

The date for final hearing of the case of the Cumberland Telephone & Telegraph Co., seeking an increase in rates in Tennessee, will be set on November 1 by the Tennessee Railroad Commission. It was decided after hearing lengthy argument on September 18.

The commission heard explanations of counsel of the company setting out reasons why the company had not furnished a valuation of its properties, as ordered in October, 1921. It was declared by the company representatives that they would be ready to submit a detailed report of property valuations not later than November 1.

First!

—first to brand Butt-Treated poles for the protection of the buyer.

—first to use a butt-treating process that insures a deeper penetration of the preservative throughout the ground-line area.

—first to give a written guarantee specifying a definite depth of penetration.

The "P & H" Guaranteed Penetration Process

is the original and strongest Guaranteed Penetration Process of butt-treatment. We agree to refund, without quibbling, the entire butt-treating price on every pole that does not show the specified half inch uniform penetration.

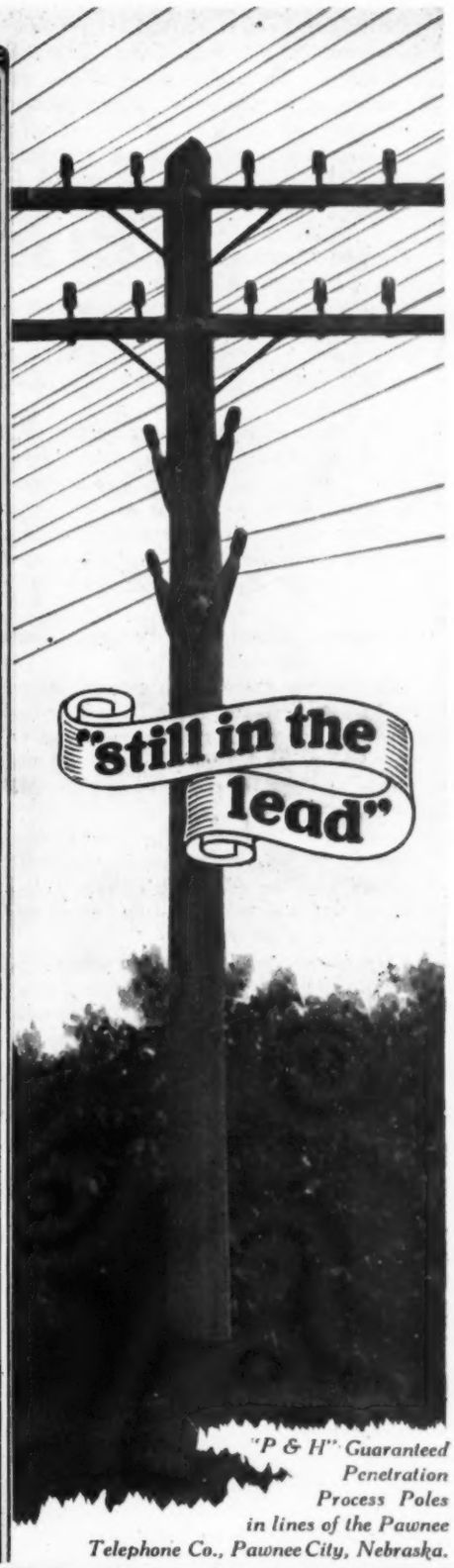
For longest pole life---for greatest satisfaction, and economy---insist on the "P & H" --- the original Guaranteed Penetration Process.

We produce and sell butt-treated and untreated Northern White and Western Red Cedar Poles; --- we can give you any form of butt-treatment; --- and we are the originators of the Guaranteed Penetration Process---the "P & H".

Prompt Shipment – yards conveniently located throughout the North Central and Western States.

Get the facts about Butt-Treatment
Write for illustrated booklet.

Copyrighted 1922 by Page & Hill Company



"P & H" Guaranteed Penetration Process Poles in lines of the Pawnee Telephone Co., Pawnee City, Nebraska.

PAGE AND HILL CO.

MINNEAPOLIS, MINN.

MAIN YARDS AND BUTT-TREATING PLANTS AT SAINT PAUL, MINNESOTA (Minnesota Transfer)

New York, N. Y. 50 Church St.
Chicago, Ill., 19 So. LaSalle St.
Kansas City, Mo. 717 Bryant Bldg.
Omaha, Neb., 513 Electric Bldg.
Houston, Texas, 1111 Carter Bldg.
Dallas, Texas, 311 Sumpter Bldg.
Buffalo, N. Y. 950 Ellicott Sq. Bldg.
Louisville, Ky. 1416 Starks Bldg.

In asking for a further delay to make the valuation report, counsel for the company declared that more than $160,000 had been spent in getting up data and inventory of its properties. They insisted, however, that pending filing of the reports on November 1, an investigation and audit should be made by the commission to expedite final hearing.

Denied Authority to Build Into Territory Already Served.

An order of September 6, issued by the Oklahoma Corporation Commission, denied the Yale Telephone Co., of Yale, a certificate of necessity to build a line from Yale to Ingalls.

The Ripley Automatic Telephone Co., of Ripley, had opposed the Yale company's petition, contending that the patrons at Ingalls were being served by the Ripley company. The commission directed that a metallic circuit to Ingalls be installed by the Ripley company.

Proposes Automatic If Increased Rates Permitted.

A complete automatic telephone system is to be installed at Temple, Texas, by the Texas Telephone Co. if the city commission will grant the application for an increase in rates recently filed by the officials of the company.

At a recent meeting of the city commission, G. B. Foscue, Jr., assistant general manager of the telephone company, appeared and filed a formal application for an increase in the rates.

The report stated in part as follows:

"The new city charter requires us to place all of our overhead construction now in the fire limits of your city underground before June 1, 1925. This work, along with other work mentioned in this report, we propose to start at once.

Our present rate of return on the value of our property in your city, as shown by the hereinafter detail report, is 6.91 per cent. Our cost of rendering service in Temple is climbing at a greater rate than our gross revenue is increasing. Therefore, we are confronted with the inevitable necessity of coming to you for an increase in rates.

The equipment in the central office of Temple exchange will, within a short time, have become obsolete and inadequate. Though it is at this date serving you quite satisfactorily, it is with the certain knowledge that this board is rapidly approaching the end of its period of usefulness, that we are at this time planning the installation of new central office equipment. . . . it appears that automatic equipment should at this time be installed in Temple."

In the application, the company stated that in order to earn 8 per cent allowed by the franchise granted to the telephone company, it would be necessary to have a rate of $5 a month for straight line business telephones, $3 for straight line telephones, and $2 to $2.50 for party line service.

The company stated in its application that to make the improvements necessary, would entail an additional investment of $159,635 which, added to the present investment, would make a total of $209,017. The company has recently purchased a lot and plans to erect a modern brick building for the exclusive use of a central office, and if the application is granted, to install in it modern automatic telephone equipment.

Three other Texas cities are now using automatic equipment. They are Dallas, Wichita Falls and Austin.

Suspends Proposed Rates of Pacific Company in Washington.

The Washington Department of Public Works has filed an order suspending the effective date for the new rates of the Pacific Telephone & Telegraph Co., which were to go into effect November 1.

The order sets the date 90 days from the date asked by the company and requires the telephone officials to file within 10 days from September 25 a long distance toll rate schedule conforming in principle to its pre-war toll rate schedules, which were changed when the Postmaster General assumed control of the telephone lines, and have not since been altered.

The new toll schedule, however, does not become effective until ordered by the department.

The order issued by the Washington Department of Public Works also demands that all controversies arising out of proposed new rates announced recently by the company be consolidated with the case instituted by the state department last January, in which present exchange rates, toll rates, contracts, charges and rules and regulations of the company and subsidiary concerns are challenged as unreasonable.

Since the institution of the action, the commission has been investigating the affairs of the Pacific Bell company and the Home company of Spokane, and has arrived at the following conclusions which it considers more or less fundamental in connection with the rate structure of telephone utilities:

"(a) That the policy which has been pursued by the respondents herein of segregating their investments in plant devoted to toll and long distance service from investments in plant devoted to exchange or local telephone service for the purpose of constructing toll and exchange rate schedules which would produce a reasonable return upon the respective investments, is regarded by the department as a doubtful justice or expediency, but from facts thus far developed the department is inclined to the view that property used and useful devoted to the service of the public should be considered as a whole and the rate schedules so designed as to produce a reasonable return on a reasonable value of the property as a whole, provided that no form of tariff or system of grouping, or segregation, should be adopted that will unduly favor any community or class of communities, to the disadvantage of others.

"(b) That the toll or long distance rate schedules should be in keepinng with the competitive conditions to be met and with due regard to the value of the service rendered, to the end that the local exchange rate schedules, which intimately touch the lives of all of the people of this state and which are a domestic necessity, should be as low as possible.

May Continue Service Installed to Accommodate Patron.

On September 27 the Wisconsin Railroad Commission ruled that public convenience and necessity required the Washington Telephone Co. to render service to J. Mousseau, and authorized that it be continued. Objections had been filed by the Plain Telephone Co., of Plain, to the extending of service by the Washington company to Mr. Mousseau. He resides about one-half mile southwest from the village of Loreto, which is served by both companies.

Several years ago a telephone was installed on the premises in question and connected with the Plain exchange, but when Mr Mousseau took possession some dissatisfaction arose and he had the service discontinued. The telephone and wire were removed. After about three years he asked the Washington company to furnish him service, his business and church relations being in the direction of its lines, which are connected to an exchange at Hillpoint. The Washington company, apparently without understanding the statutes governing extensions of telephone exchanges, accommodated Mr. Mousseau.

It also appeared from evidence at the hearing that the Plain company had extended its lines on either side of the premises of Mr. Mousseau, without securing from the town of Bear Creek any franchise or permit. The territory involved constitutes the twilight zone between the two exchanges.

During the hearing it was agreed by representatives of the two companies that connections now existing in this zone should be continued in the interest of public service.

Deny Permission to Establish Additional Toll Charge.

The application of the Knowlton Telephone Co. for authority to establish a charge of 15 cents on all incoming toll messages terminating on its lines, was denied by the Wisconsin Railroad Commission on September 27.

The Knowlton Telephone Co. is a roadway company serving 47 subscribers on four circuits connected to the switchboard

Order Now---And Be Prepared For Winter Storms

Line Wire Sleeve Before Twisting

Line Wire Sleeve After Twisting

The strength and transmission efficiency of **your** lines are largely dependent on the strength of the splices. The best guarantee for satisfactory service you can have is

RELIABLE SLEEVES

(for Perfect Splicing)

Reliable Sleeves are made and inspected to comply with the standard specifications of the largest telephone and telegraph companies.

Every sleeve that is shipped from our factory is guaranteed to pass inspection under these most exacting specifications.

Reliable Copper Sleeves have ample length, and strength to assure splices as strong as the line itself, and moreover make a low resistance splice.

Reliable Double Tube Copper Sleeves

(A. T. & T. Standard)

The "Rust Resisting Qualities" of RELIABLE Tinned Steel Sleeves far surpass any others, because of perfected methods of manufacture, which insure a "heavy" and "uniform coating" of tin.

A TEST WILL PROVE IT!

Underground Cable Sleeve

Reliable Single Tube Split Tinned Copper Cable Sleeves are just the thing for splicing underground cables. The heavy copper makes a strong splice; the tinning and open slot enable the cable man to make a perfect soldered joint. The taper enables him to insulate the splice, as well as the joint itself is insulated.

Reliable Electric Company

3145 Carroll Avenue **CHICAGO, U. S. A.**

of the Mosinee Telephone Co. at Mosinee. In its application the company set forth that it does not derive enough revenue from its present rate of $1.25 to enable it to carry on the business.

The subscribers of the Knowlton company, upon the payment of the switching fee of 50 cents a month to the Mosinee company for central office service, are given the same service as the subscribers of the latter company. This includes the privilege of long distance toll connections.

In denying the application the commission stated that if an "other line" charge were authorized for the Knowlton company it would mean the imposition of such a charge in addition to the regular toll tariffs on all incoming toll calls to subscribers of the Knowlton company. This would necessitate two different schedules of toll rates for the two companies comprising the same local system. The commission declared that if the present exchange rate is inadequate the company should apply for an increase in the exchange rate.

Summary of Commission Rulings and Schedule of Hearings.

CALIFORNIA.

October 24: Hearing at Los Angeles on application of the city for a reduction in the rates of the Southern California Telephone Co.

ILLINOIS.

October 3: Hearing held at Springfield on application for approval of purchase by Murphysboro Telephone Co., of Murphysboro, and sale by Creal Springs Mutual Telephone Co. of all of the property of the latter in Creal Springs.

October 5: Hearing held at Springfield on the petition of the Plymouth Farmers Switchboard Co. for an advance in rates for service in Plymouth.

October 5: Hearing held at Springfield in the matter of petition for approval of purchase by Illinois Bell Telephone Co. and sale by Home Telephone Co. of Cairo of the property of the latter company and all farmer and toll lines connected therewith; also the assumption by the Illinois Bell Telephone Co. of outstanding mortgage bonds of the Home company to the amount of $37,500. Protest filed by citizens of Cairo against increased rates by Home Telephone Co. and Illinois Bell Telephone Co. Objections also filed by Mound City and Mounds.

October 5: Hearing held at Springfield in the matter of application of the Illinois Bell Telephone Co. for a certificate of convenience and necessity to operate exchanges in Mounds and Mound City. Consolidated with above case.

October 5: Hearing held at Springfield on citation to Automatic Home Telephone Co., of Pontiac, to show cause why toll connections should not be re-established between Cornell and Pontiac.

October 5: Hearing held at Springfield on petition for consent to sale by Mann Telephone Co. and purchase by Camp Point Telephone Co. of the property of the former company in Camp Point; also application for a certificate of convenience and necessity to operate in Camp Point; and application for authority to issue $10,000 of the capital stock of the Camp Point Telephone Co.

KANSAS.

September 19: Hearing held at Topeka in the matter of investigation as to the holdings of the Southwestern Bell Telephone Co. in competing companies.

September 21: Hearing held at Topeka on petition of citizens of Silver Lake and Rossville for a reduction in the rates of the Shawnee Independent Telephone Co. Case taken under advisement.

MINNESOTA.

September 28: Permission given Tri-State Telephone & Telegraph Co. to purchase controlling stock in Red Wing Telephone Co., of Red Wing. Tri-State company ordered to mail to every stockholder of the Red Wing company a notice stating the price per share to be paid for the majority of the stock and offering to buy the shares held by each stockholder at the same price, should the stockholder elect to accept the amount and surrender his stock within a period of 90 days from the mailing of the notice.

MISSOURI.

September 23: Effective date of proposed increased rate schedule of Browning Telephone Co., of Browning, postponed from October 1 to January 28, 1923; hearing to be held in the meantime.

September 23: Order entered dismissing petition of Noel Telephone Co. for authority to consolidate its Lanagan exchange with its exchange at Noel, dismissal being requested by petitioner.

September 26: Supplementary order No. 1 entered further increasing rates of the Columbia Telephone Co., of Columbia, upon showing by the company that it has installed switchboard and increased force, as required by order of March 17. Rural increase not allowed as the company has not improved its rural lines as required in the order.

NEBRASKA.

September 26: Hearing on the application of the Pawnee Telephone Co. for an increase in rates; testimony of applicant and protestants taken, and case taken under consideration, with permission to Manager Becker to file exhibit justifying the salary drawn by himself, the amount of which was challenged by objectors.

September 27: Complaint filed by Ray Timperling and others against the Northwestern Bell Telephone Co. and request made that it be ordered to restore rural service on its Norfolk exchange which complainants aver was cut off without explanation and restoration of which has been refused without any reason being given.

September 27: Application filed by the Farmers Independent Telephone Co., of Red Cloud, asking that the commission validate rates for special services, including desk sets, put in without authority, and also to confirm action of directors in abandoning the gross and net method of rendering bills.

September 29: Hearing on application of Crete Telephone Co. for permission to increase residence rates and to make optional rates on farm service; objectors appeared and testimony taken on both sides; case taken under consideration with understanding that no increase will be allowed except upon the condition that a new switchboard be purchased and such other steps as are necessary to restore normal service be taken.

NEW YORK.

October 5: Hearing held at Albany on the investigation of the state-wide affairs of the New York Telephone Co.

October 5: Hearing held at Albany on petition of the New York Telephone Co. for increased rates in New York City.

NORTH DAKOTA.

September 18: Application filed by Independent Telephone Co., of Keene, for authority to issue $25,000 worth of capital stock.

September 20: Griggs County Telephone Co., of Cooperstown, allowed to buy the property of the McHenry Telephone Co.; certificate issued.

October 9: Hearing at Palermo on schedule of exchange rates filed by Palermo Village Telephone Exchange.

OHIO.

September 20: Hearing held in Columbus on application of Ohio Bell Telephone Co. for higher rates in Findlay in connection with unification. Further hearing to be held on October 13.

OKLAHOMA.

September 19-20: Hearing held in Oklahoma City on objections of telephone companies to proposed order reducing removal charges.

TENNESSEE.

September 18: Cumberland Telephone & Telegraph Co. ordered to have valuation report ready by November 1 at which time a date will be set for the final hearing.

September 20: Application of Gibson County Telephone Co., of Trenton, to lease its system to J. W. Moore for a period of four years, Mr. Moore to assume all obligations of the company; approved.

WASHINGTON.

September 25: Order entered suspending effective date for new rate schedule of Pacific Telephone & Telegraph Co. to 90 days from Novmber 1. Company required to file within 10 days a long distance toll schedule conforming to its prewar rates.

WEST VIRGINIA.

September 20: Petition filed by the town of Man for an order requiring the Chesapeake & Potomac Telephone Co. to establish service in that town.

WISCONSIN.

September 21: Petition filed by residents of Mayville to have increased rates set aside, alleging that service has not been improved as required in order.

September 25: Belmont & Pleasant View Telephone Co., of Belmont, authorized to establish schedule of advanced rates.

September 27: In the matter of complaint of Bert Sparks, of Wisconsin Rapids, on behalf of the Sparks Line, against J. S. Camp; dismissed, it appearing that there was no extension of telephone service by the Camp lines as complained of.

September 27: In the matter of complaint of Plain Telephone Co., of Plain, against Washington Telephone Co.; Washington company authorized to continue furnishing service to J. Mousseau.

September 27: Hillsdale Western Telephone Co., of Hillsdale, authorized to increase its rate from $4 to $12 a year.

September 27: Application of Knowlton Telephone Co. for authority to establish a charge of 15 cents on all incoming toll messages terminating on its lines; denied.

October 10: Hearing at Madison on application of Eastern Wisconsin Telephone Co., of Chilton, for authority to increase its rates on Quarry-Valders circuit. U-2770.

October 10: Hearing at Madison on application of Eastern Wisconsin Telephone Co., of Chilton, for authority to increase rates on Glenbuelah business circuit. U-2778.

October 17: Hearing at Madison on application of Marion & Northern Telephone Co., of Marion, to increase toll rates.

Are You Aware

that NORTH P. A. X. and P. B. X. equipments give the same **SUPERIOR SERVICE** and show the same **ECONOMY OF OPERATION** characteristic of NORTH AUTOMANUAL and AUTOMATIC Main Exchange Systems?

Do you know that the NORTH ALL-RELAY P. A. X. or P. B. X. can be left **UNATTENDED FOR MONTHS AT A TIME?**

It will pay you to investigate the NORTH ALL-RELAY Systems before installing Private Exchanges.

The
NORTH
ELECTRIC MANUFACTURING COMPANY
Galion, Ohio

"COPPERWELD"
TRADE MARK REG. U.S. PAT. OFF.
TWISTED PAIR

To you who are using it no more need be said—

To you who are not—write for prices and then specify Copperweld on your order.

The value of an article is not what it costs but the service it gives

COPPERWELD—MADE BY THE MOLTEN WELDING PROCESS

COPPER CLAD STEEL COMPANY
NEW YORK SALES OFFICE: 30 CHURCH STREET, NEW YORK
CHICAGO SALES OFFICE 129 S. JEFFERSON ST., CHICAGO
MAIN OFFICE AND WORKS: BRADDOCK P.O. RANKIN, PA.

The ***Handyman***
Guy Stretcher

Operated by **one** man. Capacity 6,000 lbs. Weight, only 26 lbs. A continuous stretch or pull of four feet. No slack lost. No danger of slipping or breaking. Also used to take slack in underground cables.

THINK OF IT—A one-man Tool that does the work of five men or more, saves hours of time, and eliminates block and tackle. Just fasten the swivel hooks to your come-alongs and guy or messenger is stretched to capacity.

SERVES MANY OTHER PURPOSES

Write us or ask your Jobber.

Harrah Mfg. Co.
Bloomfield
Indiana

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

From Factory and Salesroom

Convention: United States Independent, Chicago, October 24-27.

Monarch Company Purchasing Agent Becomes a Benedict.

Wilbur J. Hubacher, the genial purchasing agent of the Monarch Telephone Mfg. Co., Fort Dodge, Iowa, was married to Miss Helen Josephine McCormack, of Fort Dodge, on September 12.

Mr. Hubacher has been with the Monarch company for the past several years.

Combined Operating-Manufacturing Exhibit Proves Attractive.

The booth in the illustration on this page, which was invitingly arranged, was jointly occupied by the Roschester Telephone Corp. and the Stromberg-Carlson Telephone Mfg. Co. at the industrial exposition in Edgerton Park, Rochester, N. Y., during the week of September 3.

W. J. Hubacher, of the Monarch Mfg. Co.

During this exhibition the Rochester Telephone Corp. rendered city service to visitors and exhibitors by means of the booths and the Stromberg-Carlson No. 102 P. B. X. switchboard, both of which are shown in the illustration.

The Stromberg-Carlson Telephone Mfg. Co. displayed its complete line of P. B. X. switchboards, its No. 986 desk telephones, and a panel showing the development of the Stromberg-Carlson desk telephone from 1893 to 1922.

Harrah Tools Facilitate Construction and Repair Work.

The Handyman guy-stretcher, a tool to take the place of the block and tackle in stretching guy and messenger wire is manufactured by the Harrah Mfg. Co. of Bloomfield, Ind. It is also used to take up the slack in underground cables.

Handyman Guy Stretcher Makes Working on Guy and Messenger Wire Easy.

It weighs but 26 pounds and is quickly attached and easily operated by one man. Particular features claimed for it are the four-foot stretch without stopping and a positive hold so that clamps can secure the wire without losing any slack.

The Harrah company also makes a pole-pusher for straightening leaning poles. This is also operated by one man and it is credited with a pushing capacity of ten men.

Another product of this company is a new pole pulling jack which weighs 50 pounds. The manufacturers state that it will pull 35 and 40-foot poles out of the ground five feet in one operation.

Selling Flowers Over Long Distance Telephone.

To the slogan "Say It with Flowers," a large wholesale florist in New York has added, for his own benefit, the further maxim, "Say It by Long Distance." Practically his entire volume of orders is taken over the telephone.

The remarkable feature of his successful use of the telephone in promoting sales is that his territory extends as far west as Cincinnati, while its northern extremity lies in Canada, with Atlanta, Ga., as the outpost on the southern frontier.

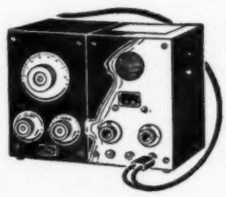
This Exhibit of the Stromberg-Carlson Mfg. Co. and the Rochester Telephone Corp., of Rochester, N. Y., Attracted Much Attention.

STANDARD
Colonial Copper Clad Wire
TRADE C.C.C. MARK
combines the strength of steel with the conductivity and rust-resistance of copper. Write our nearest office for Bulletin 202.
Standard Underground Cable Co.
Boston Philadelph'a Chicago St. Louis
Pittsburgh New York San Francisco Detroit

DIAMOND EXPANSION BOLT Co
90 West St. ◇ New York
MANUFACTURERS
Expansion Bolts Drills
Screw Anchors Toggle Bolts
Cable Clamps Bridle Rings
Duct Rods Guy Clamps
GALVANIZING
PLANT - GARWOOD, N. J.
DISTRIBUTORS
Western Electric Company
INCORPORATED

A Valuable Book for a Small Price
A practical and explicit work on many problems of the magneto exchange.
THE INSPECTOR and THE TROUBLEMAN
by Stanley R. Edwards and A. E. Dobbs
embodies an extensive explanation in plain English of magneto exchanges, line construction, telephone troubles, and the theory of electricity as applied to telephony, with diagrams and illustrations to make clear the various points. The man in the small exchange will find this book especially valuable.
With Paper Cover, 40c.
With Cloth Cover, $1.00
Telephony Publishing Corp.
116 So. Michigan Ave. Chicago, Ill.

DID YOU KNOW THAT—
the Gund No. 1 Drive & Twist Anchor, under our new process, is now a complete drop forging? There's no weld or seam. A remarkable anchor—right for those close quarters. Right in any soil and holds in any soil. Tested by G. F. Gebhardt, Mechanical Engineer of the Armour Institute of Technology to 2760 lbs. in sandy loam.
No earth to move or remove. Above the blades it remains undisturbed. An economical, speedily installed anchor that HOLDS. That's the Gund No. 1. And the price—$1.30 each.
"Just drive it down, then three twists."
GUND MFG. CO.
La Crosse, Wis.

Radio for Telephone Co's

As distributors for the Radio Corp. of America we are ready to assist Telephone Companies on Radio Sales and Service.
We still boast about our good Service on Telephone Supplies
ILLINOIS ELECTRIC CO.
Chicago, Ill. Los Angeles, Cal.

Bonitas *for Speed*

SEND for a sample of Bonita Aerial Cable Rings and see why they can be attached twice as quickly as others.
CAMERON APPLIANCE CO.
EVERETT, MASS.

Please tell the Advertiser you saw his Advertisement in TELEPHONY.

Condensed Telephone News

Officers of Companies Are Urgently Requested to Forward to Us Promptly All Financial and Other Statements as Soon as Issued and Any Items Relating to Construction, Rebuilding, or Changes in Their Plants and Systems

New Companies and Incorporations.

MOBILE, ALA.—Home Telephone Co. incorporated with 3,840 shares without par value; $76,800 actually paid in. The incorporators are: W. H. Bryant, C. C. Handy, E. H. Cady, J. K. Klenmore, Gordon Smith, W. H. Reynolds and Jacob Reiss.

LITTLE ROCK, ARK.—Articles of incorporation for the Suburban Telephone Co. of Little Rock have been filed with the county clerk by M. L. Sachs, president; D. K. Hawthorne, secretary and treasurer; and C. C. Lovejoy. The capital stock is $50,000, of which $300 has been subscribed.

The company proposes to erect approximately 15 miles of rural telephone lines along the Little Rock and Hot Springs highway, the upper Hot Springs road and the Mabelvale pike.

The telephone will have a direct connection with the Southwestern Bell system.

AKRON, COLO.—C. A. Wilson, H. H. Johnson and E. C. Babbitt have incorporated the Poverty Flat Telephone Co. with a capital of $500.

CAMP POINT, ILL.—The Camp Point Telephone Co. has been organized by W. W. Tracy, Ida M. Tracy and C. E. Tracy, formerly of the Palmyra Telephone Co., Palmyra, Mo. The capital is given as $12,000. C. E. Tracy is the correspondent.

NEWTON, ILL.—W. H. Houser, Ed Nigh, P. B. Finley, E. W. Hersh and C. D. Fithian have formed the Jasper County Telephone Co. Andrews & Real, attorneys, in Mattoon, are the company's correspondent.

BATAVIA, IOWA.—The Peoples Home Telephone Co. has been incorporated with an authorized capital stock of $25,000, divided into 1,000 shares of $25 par value. The officers and incorporators are: Harold L. Beyer, of Grinnell, president; H. T. McCaig, vice-president; and G. L. Saunders, of Grinnell, secretary-treasurer.

LONE TREE, IOWA—Articles of incorporation have been filed by the Lone Tree Telephone Co. giving the capital as $10,000. The officers are: President, W. F. Lietz; vice-president, H. C. Hinkley; secretary-treasurer, S. N. Alexander. These with John Kline and Frank Huskins form the board of directors.

Construction.

SAN DIEGO, CALIF.—Another appropriation of $25,000 has been made by the Pacific Telephone & Telegraph Co. on the $350,000 construction program inaugurated some weeks ago. The latest appropriation will be used in establishing general terminal and distributing facilities and aerial open-wire construction adequate for filling orders for service now held by the company. Further relief projects include the installation of an additional 36,000 feet of aerial cable.

SAN FRANCISCO, CALIF.—A new 50-booth pay station is to be constructed at 105 Powell Street, according to announcement recently made by the Pacific Telephone & Telegraph Co. It will cost $10,000.

PAHOKEE, FLA.—A telephone line is being constructed from Belle Grade to Pahokee. The pole work is nearly completed. The towns to be served by the company installing this line are Georworth, Belle Grade, South Bay, Okeelanta, Pahokee, Canal Point and Sugar Mill.

HARRISBURG, ILL.—Work was recently started on clearing the site for a nine-story fireproof bank building. The future home of the Harrisburg exchange of the Murphysboro Telephone Co. will be in this building.

PEORIA, ILL.—The new building of the Illinois Bell Telephone Co. to house its automatic equipment will cost $275,000. The apparatus will amount to $500,000, the power plant alone to cost $75,000. It is expected the new switchboard will be connected in February, 1923.

MUNCIE, IND.—The Indiana Bell Telephone Co. has completed a direct line from Muncie to Indianapolis. Direct lines have also been established between Evansville and Oakland City; Rushville and Shelbyville; Marion and Warsaw; Logansport and Brazil; and Logansport and Clinton.

FAIRFIELD, IOWA.—The Jefferson County Telephone Co. has made plans to construct a new $75,000 telephone plant. The building will be two stories high and new equipment will replace that now in use.

MINDEN CITY, MICH.—The Minden City Telephone Co. building is being moved to a new foundation. The first floor will be remodeled for the post office and the upper floor for the telephone office.

SEATTLE, WASH.—The Pacific Telephone & Telegraph Co. has construction work under way which will provide service for White Center and Dumar Heights. The cost has been estimated at $25,000. Additions to the Fort Lawton district, which are also under construction, will require an investment of another $25,000.

Financial.

LOST NATION, IOWA—At a special meeting of the stockholders of the Lost Nation Telephone Co. it was decided to double the capital stock and have the organization reincorporated for $10,000. The former capital stock was $5,000.

Elections.

ELDORADO, ILL.—At its annual meeting the Eldorado Telephone Co. elected the following officers: W. L. Ford, president; W. T. Westbrook, vice-president; Chas. Organ, secretary, and A. C. Purcell, treasurer.

LAVERGNE, TENN.—The officers elected at the annual meeting of the Lavergne Home Telephone Co. are: W. A. Mason, president; T. H. Mason, vice-president; Dora Mason, secretary-treasurer. During the next year the following will serve as directors: W. E. Akin, A. H. Owen, W. A. Mason, W. B. Eskridge, Claud Goodman, T. H. Mason and Dr. John A. Ewing.

Miscellaneous.

DENNISON, IOWA.—The Crawford County Telephone Co. has filed notice of renewal of its corporate existence for a period of 20 years from July 10, 1922. The authorized capital stock is given as $120,000, divided into shares of $100, each to be paid in full when issued. The notice states that stock to the amount of $102,308 has been fully paid for and issued.

ONIDA, S. D.—The property of the Onida Telephone Co. has been sold by Edward Loitwood to P. F. Orcutt, of Weaver, who will manage the system. The sale included the office building in which the central exchange is located.

POSITION WANTED

POSITION WANTED—In Ohio or Indiana as wire chief, superintendent or manager, by a practical and competent telephone man. 16 years' experience, and references from officials of some of the best known companies in these states. Address 5115, care of TELEPHONY.

WANTED—Position as chief switchman or equipment superintendent with company using Strowger Automatic. Employed at present but wish to locate permanently. Age 28. Married. Best of references furnished. Address 5104, care of TELEPHONY.

POSITION WANTED—Can meet all requirements as telephone man. Am married. 15 years of service. Best of references. Prefer switchboard job. Address Box 558, Denton, Tex.

WANTED—Charge of one-man telephone exchange. Twenty years' experience. Have test instruments and tools, also car. References A-1. Prefer Nebraska or Oklahoma. Address 5098, care of TELEPHONY.

POSITION WANTED—As manager or troubleman of Independent telephone exchange, experienced common battery or magneto. Address M. A. Hubbard, Clearwater, Minn.

WANTED TO BUY

WANTED—One Berry telephone test, calibrated; must be in good working order. Give me your lowest cash price. Address Alex Schmidt, 1309 Elm St., Marysville, Kan.

FOR SALE

FOR SALE CHEAP—One Automatic transformer, 120-volt battery and 20-cycle ringing machine, as we have no use for same. This ringer is in number one condition. Answer quick. Address H. Wheaton, Secy., Marion County Mutual Telephone Co., Dallas, Iowa.

FOR SALE—Telephone plant, 1800 population, main and branch line of Missouri Pacific, also Missouri Pacific Division Point. Shops handle much work. Exchange pays $400.00 per month; 4,000 feet of 50 and 100-pair cable, some 25. Two-position Kellogg Switchboard. $13,000 cash or terms for part. Address Crane Telephone Company, Crane, Mo.